00TE80" 9THES960

FIG. 1

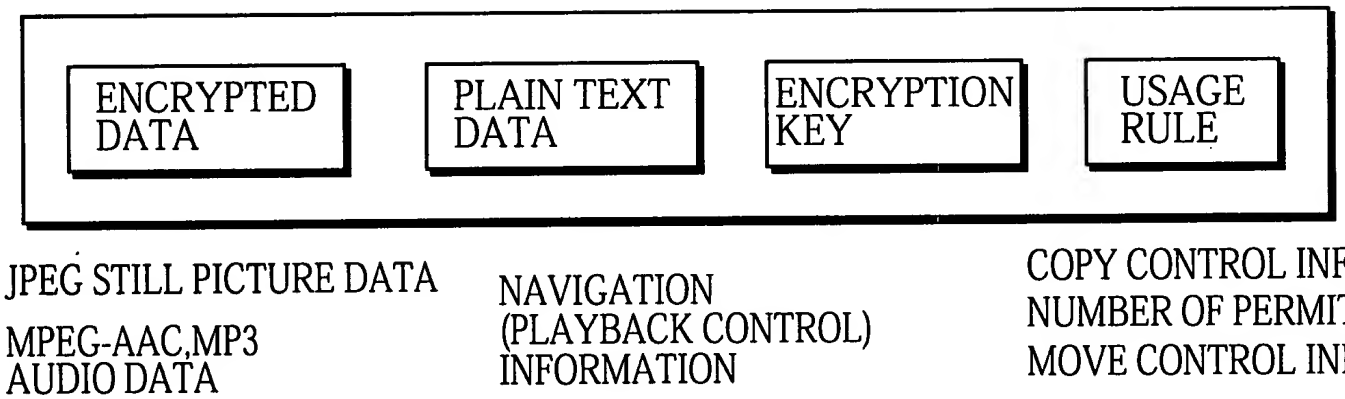


FIG. 2A

RECORDING MEDIUM

※NO ENCRYPTION KEY SO DEVICE HAVING THIS RECORDING MEDIUM CANNOT PLAY BACK COPYRIGHTED MATERIAL

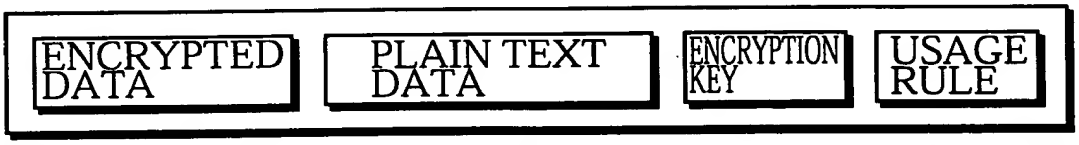
FIG. 2B

RECORDING MEDIUM

※HAS AN ENCRYPTION KEY, SO DEVICE HAVING THIS RECORDING MEDIUM CAN PLAY BACK COPYRIGHTED MATERIAL
NO USAGE RULE,SO COPYRIGHTED MATERIAL CANNOT BE RECORDED TO ANOTHER RECORDING MEDIUM

FIG. 2C

RECORDING MEDIUM



※HAS AN ENCRYPTION KEY, SO DEVICE HAVING THIS RECORDING MEDIUM CAN PLAY BACK COPYRIGHTED MATERIAL
HAS A USAGE RULE,SO COPYRIGHTED MATERIAL CAN BE RECORDED ON ANOTHER RECORDING MEDIUM

0074950.0950

FIG. 3A

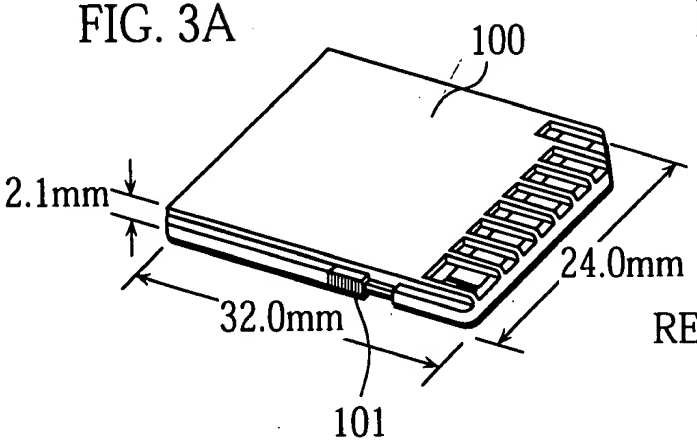


FIG. 3B

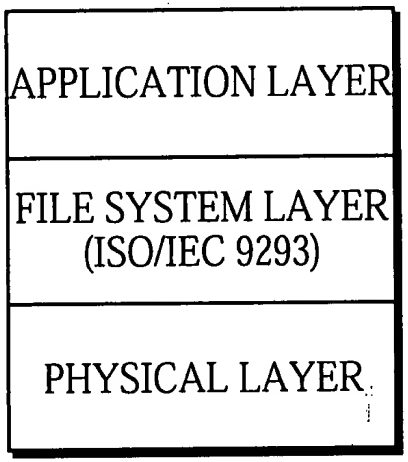


FIG. 3C

PHYSICAL LAYER OF SD Memory Card

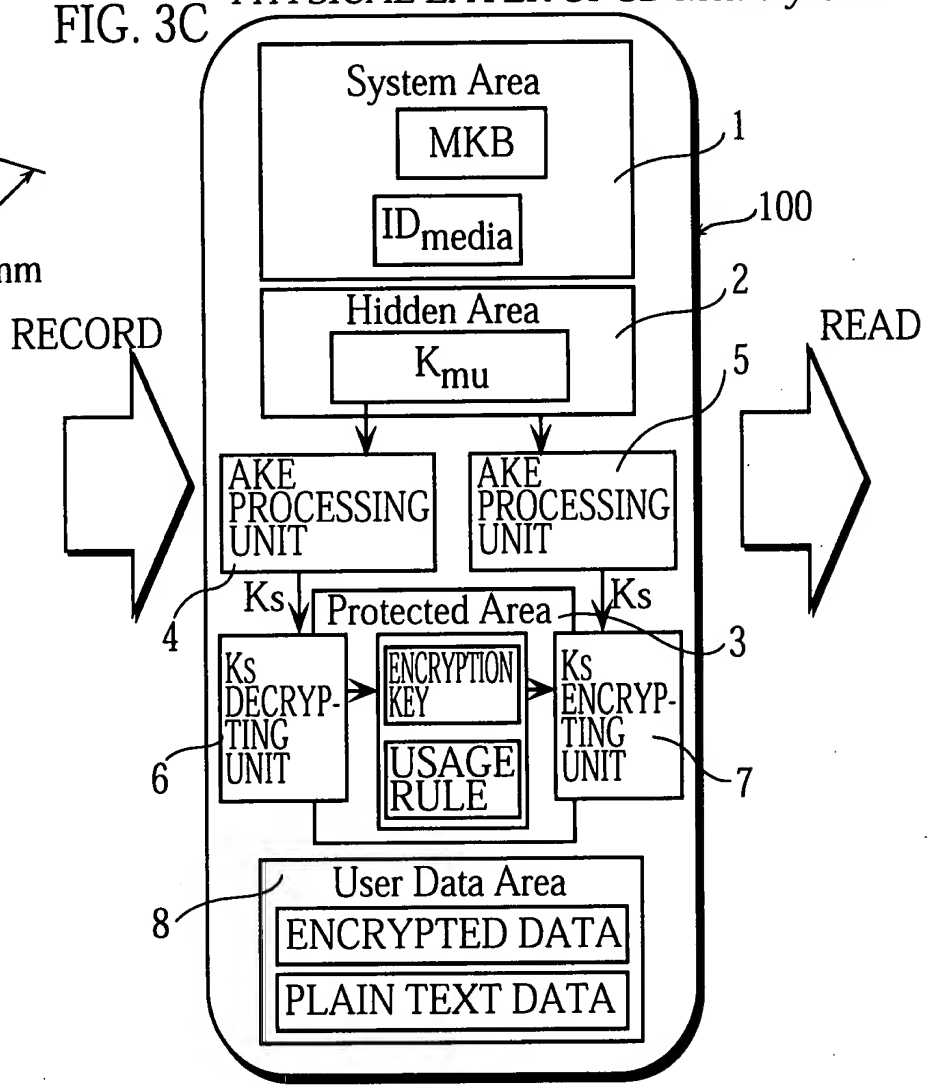


FIG. 4A

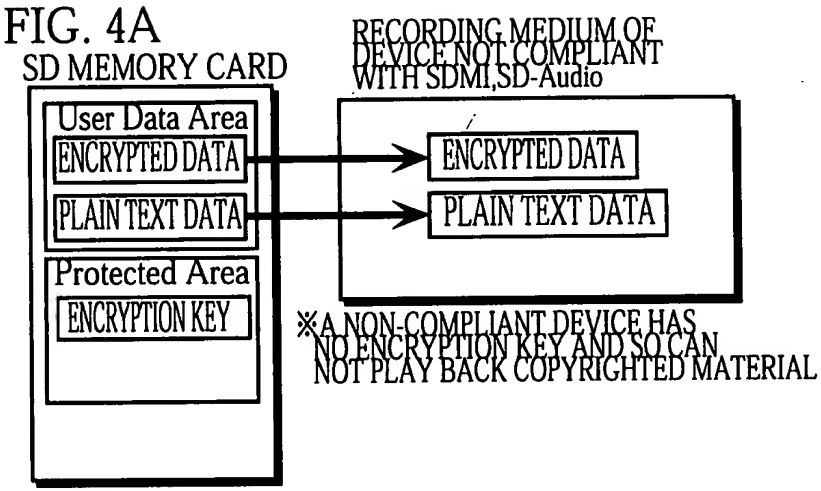


FIG. 4B

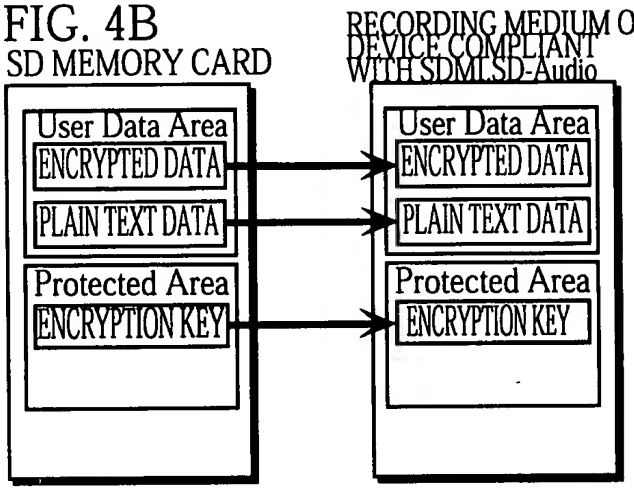


FIG. 4C

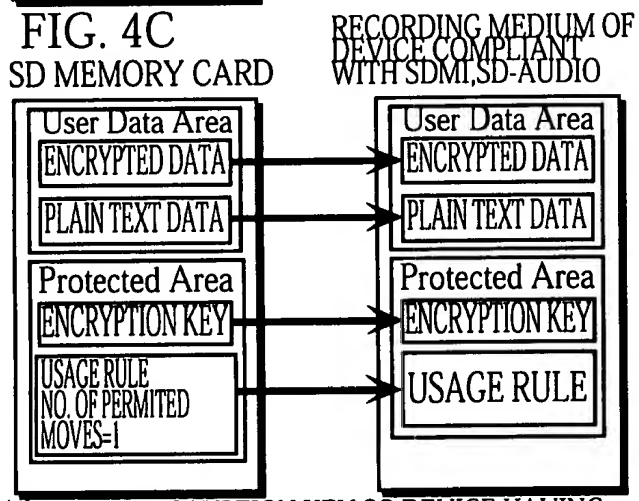


FIG. 4D

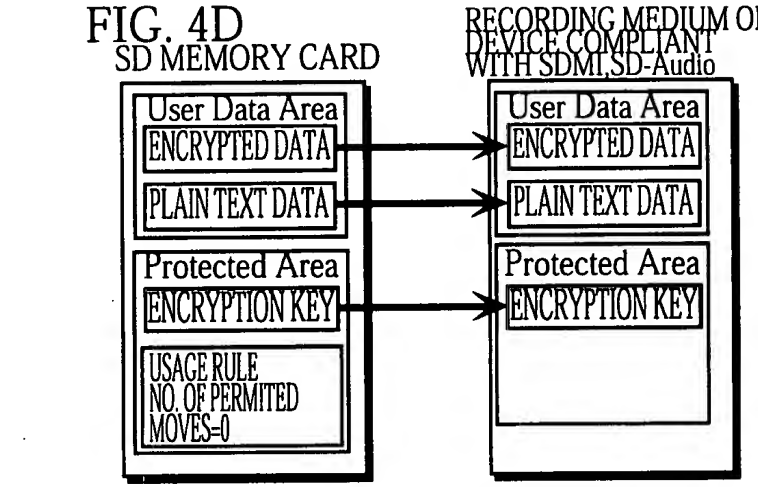


FIG. 5

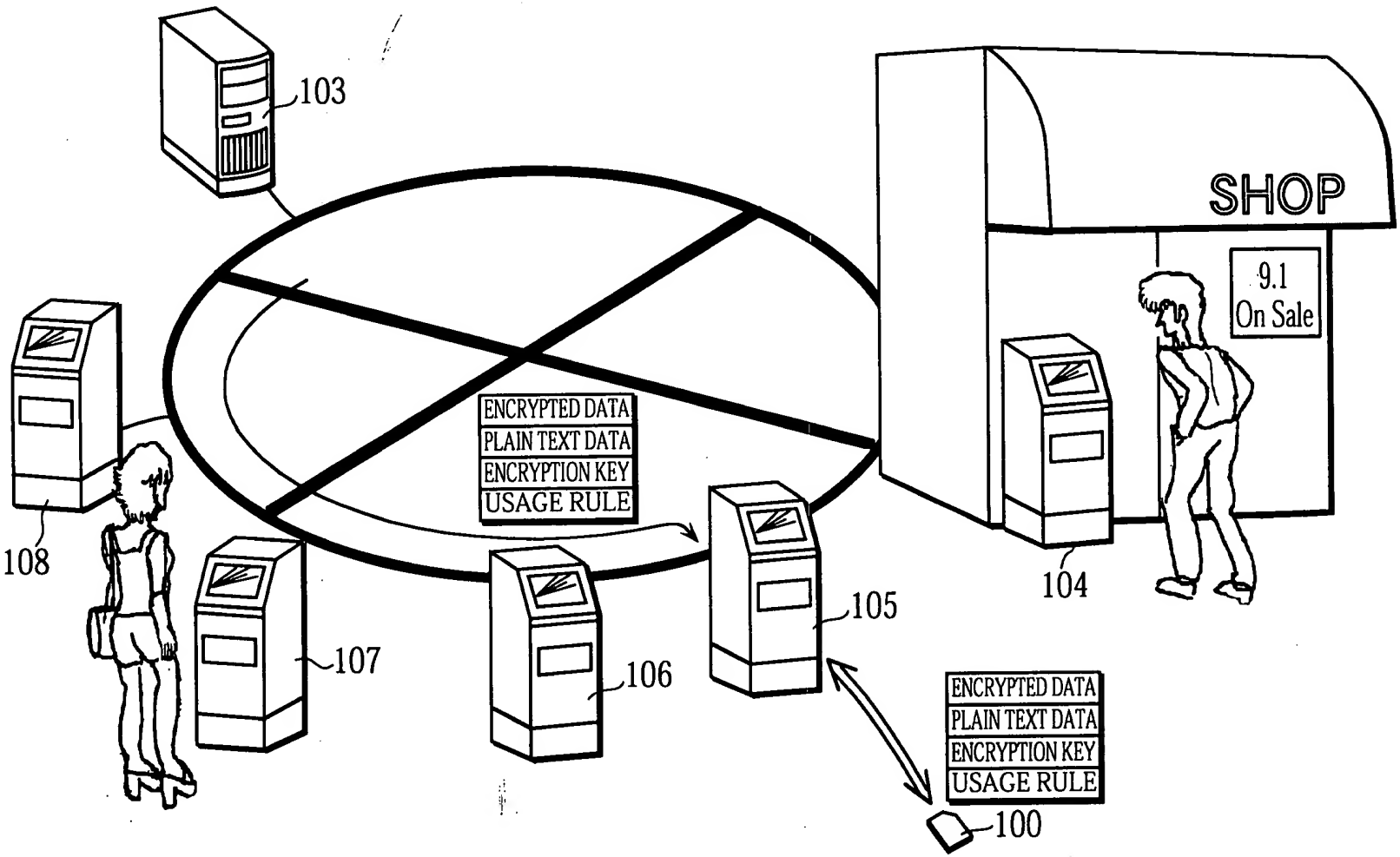

103
SHOP
9.1
On Sale
ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE
108
107
106
105
104
ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE
100

FIG. 6A

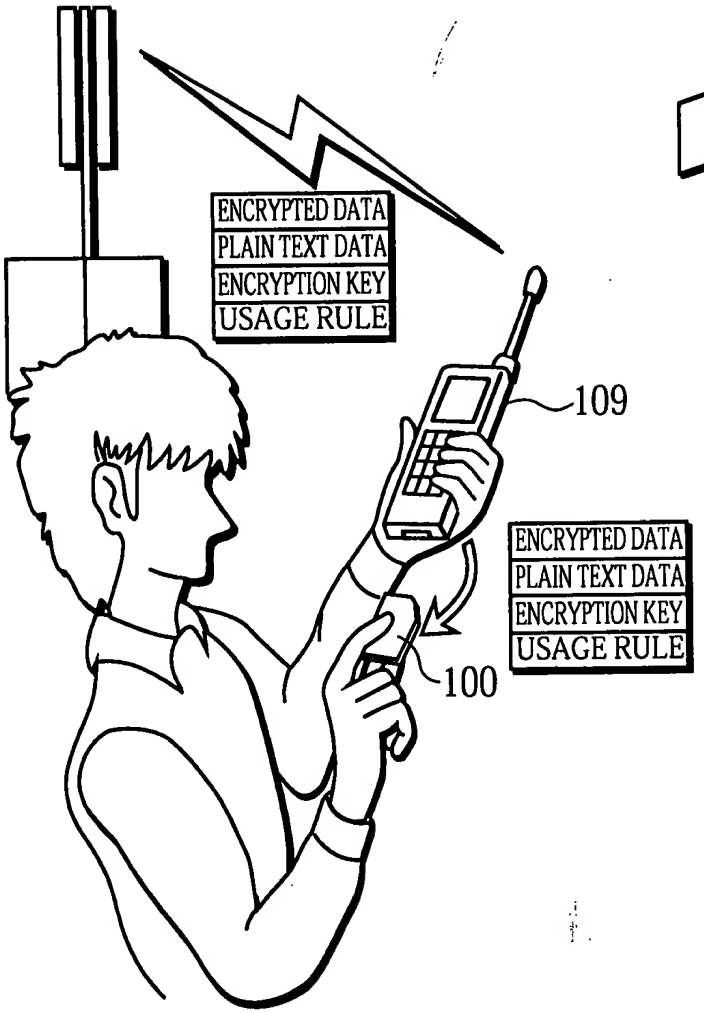

ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE
109
ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE
100

FIG. 6B

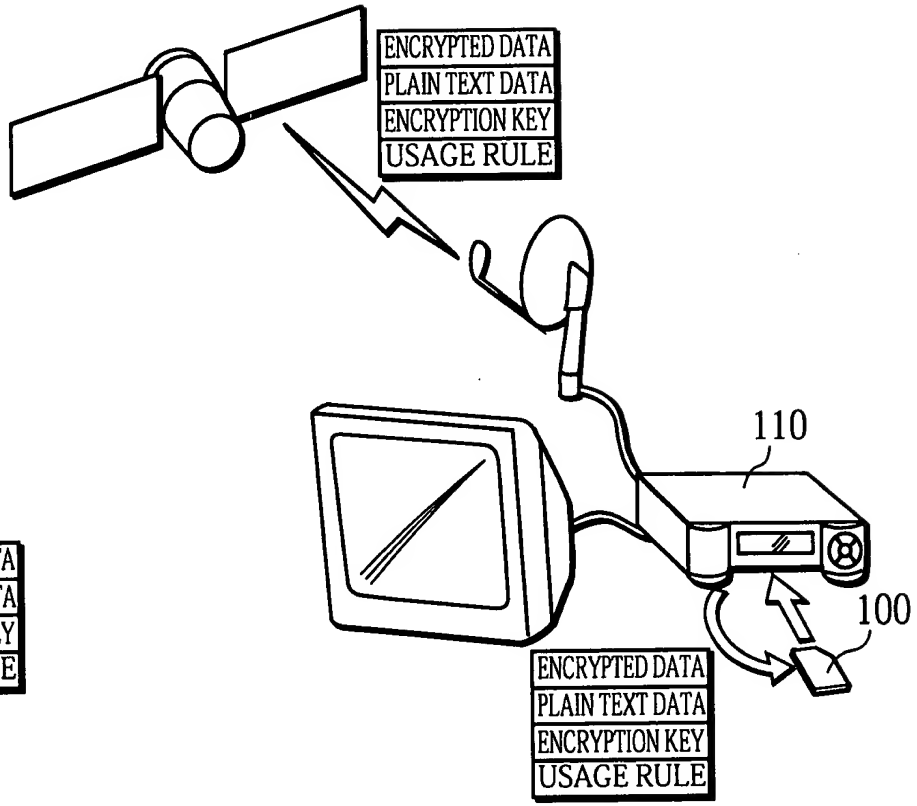

ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE
110
100
ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE

FIG. 7A

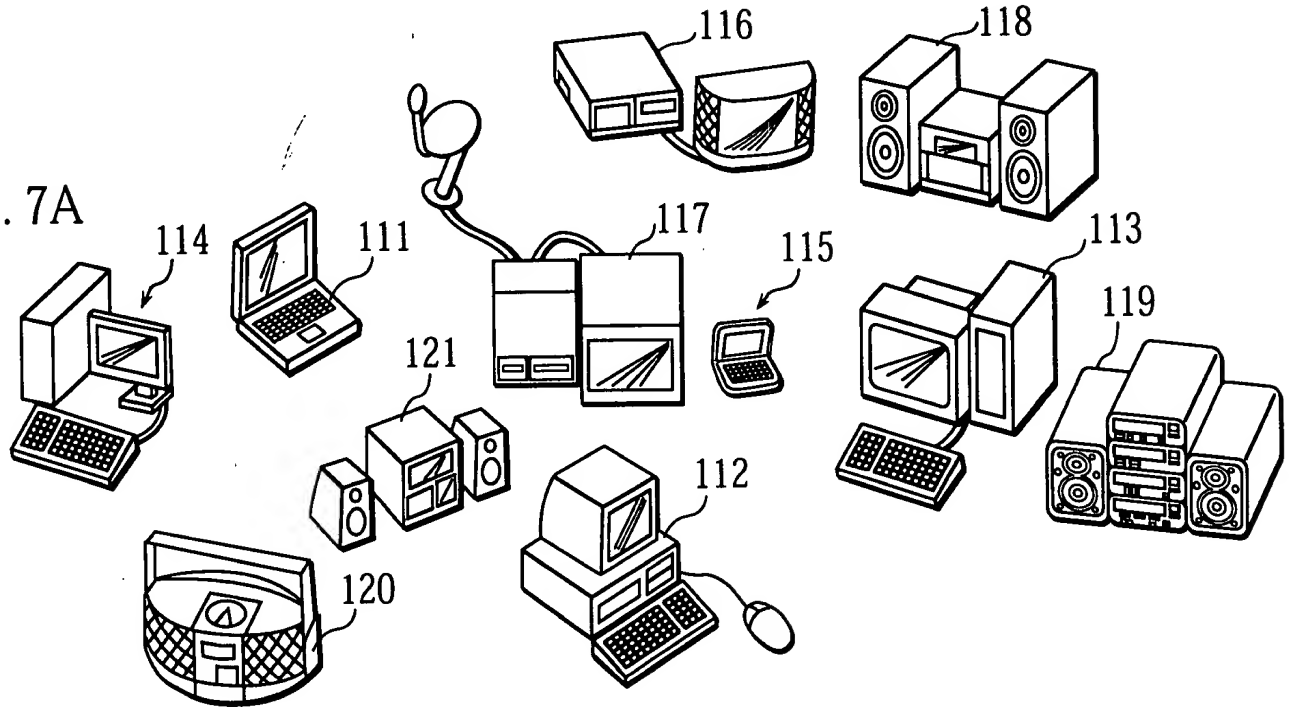


FIG. 7B

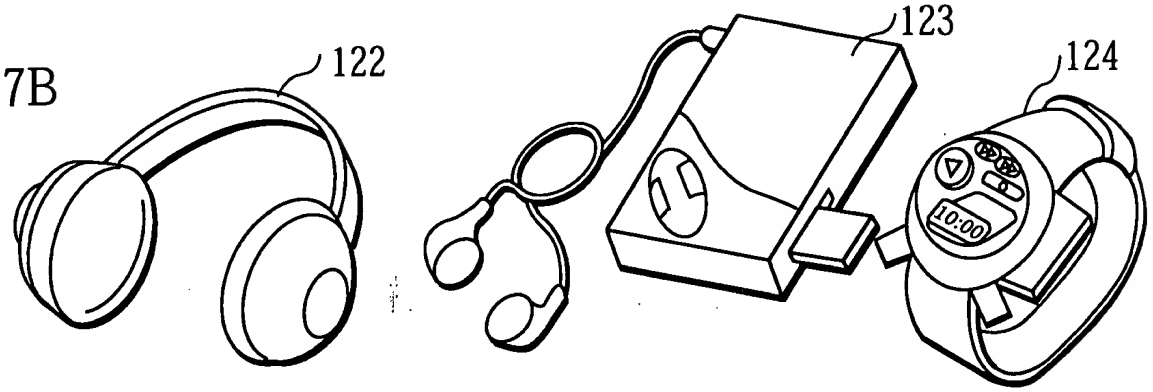


FIG. 8A

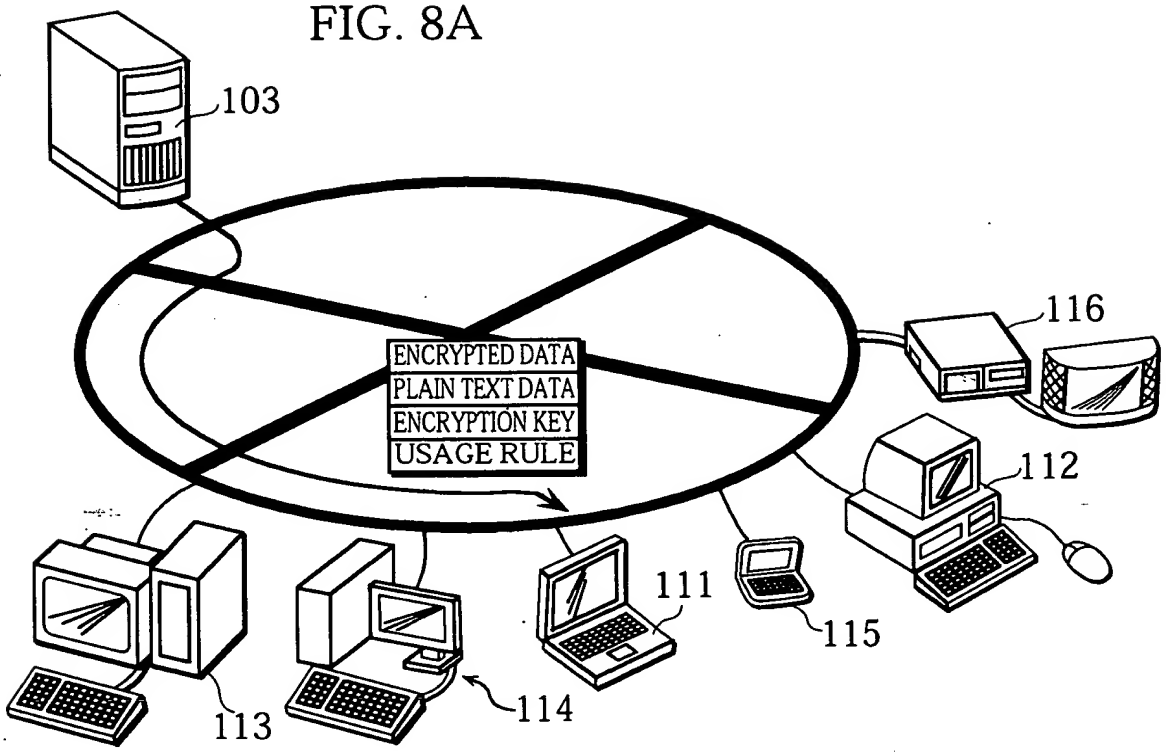


FIG. 8B

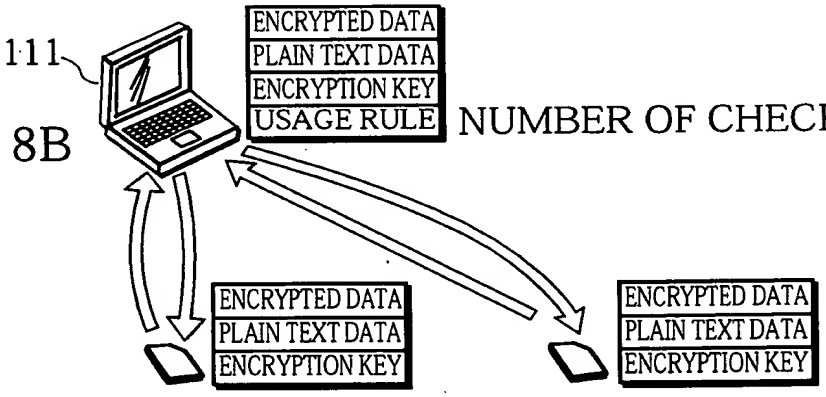


FIG. 8C

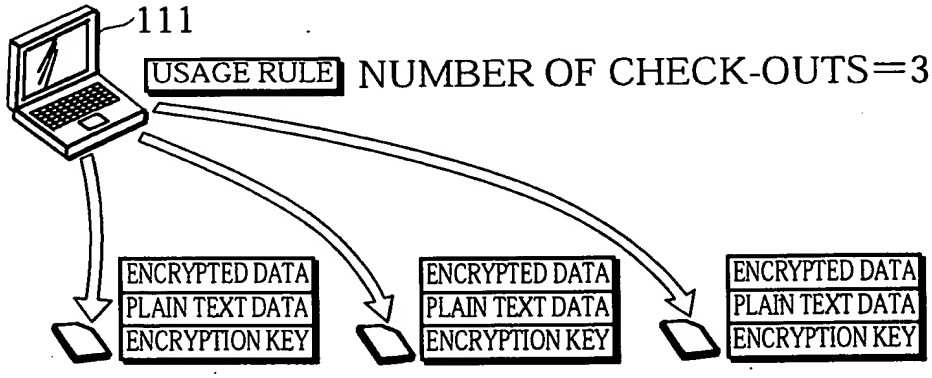


FIG. 9

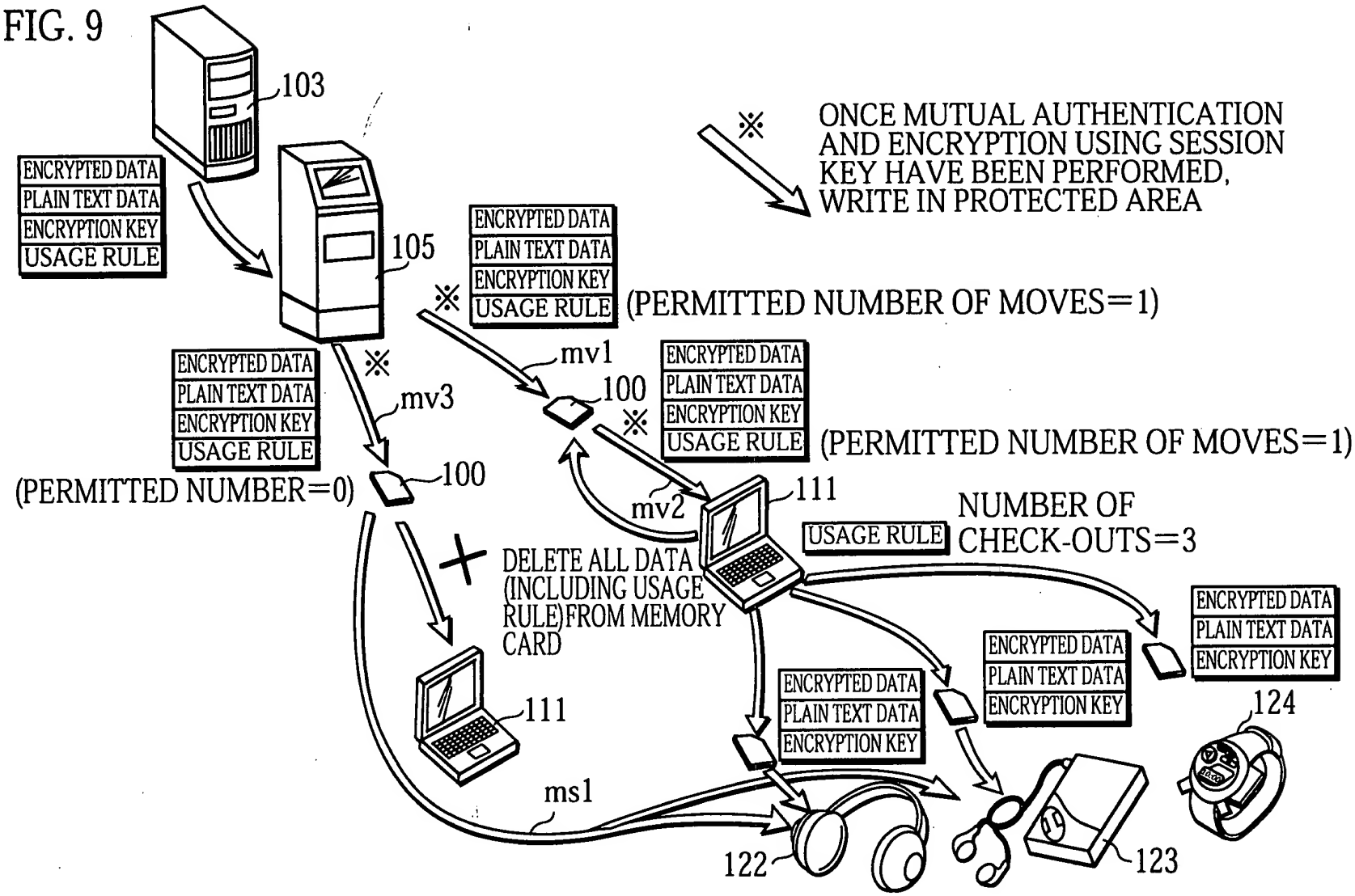

103
ENCRYPTED DATA
PLAIN TEXT DATA
ENCRYPTION KEY
USAGE RULE
105
※
ONCE MUTUAL AUTHENTICATION AND ENCRYPTION USING SESSION KEY HAVE BEEN PERFORMED, WRITE IN PROTECTED AREA
(PERMITTED NUMBER OF MOVES=1)
mv1
100
mv3
(PERMITTED NUMBER=0)
mv2
111
NUMBER OF CHECK-OUTS=3
DELETE ALL DATA (INCLUDING USAGE RULE) FROM MEMORY CARD
ms1
122
123
124

FIG. 10

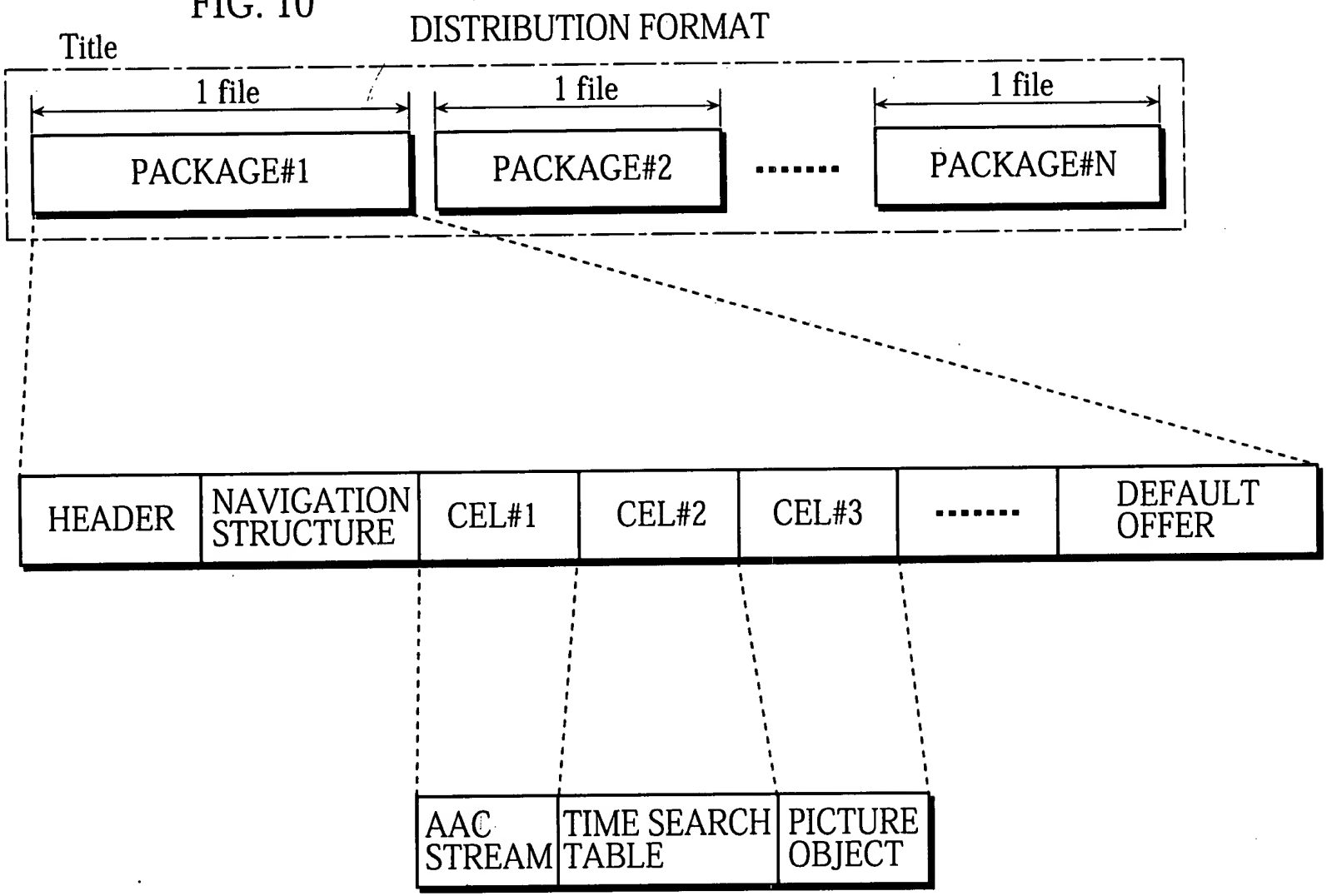

DISTRIBUTION FORMAT
Title
1 file
1 file
1 file
PACKAGE#1
PACKAGE#2
.....
PACKAGE#N
HEADER
NAVIGATION STRUCTURE
CEL#1
CEL#2
CEL#3
.....
DEFAULT OFFER
AAC STREAM
TIME SEARCH TABLE
PICTURE OBJECT

FIG. 11

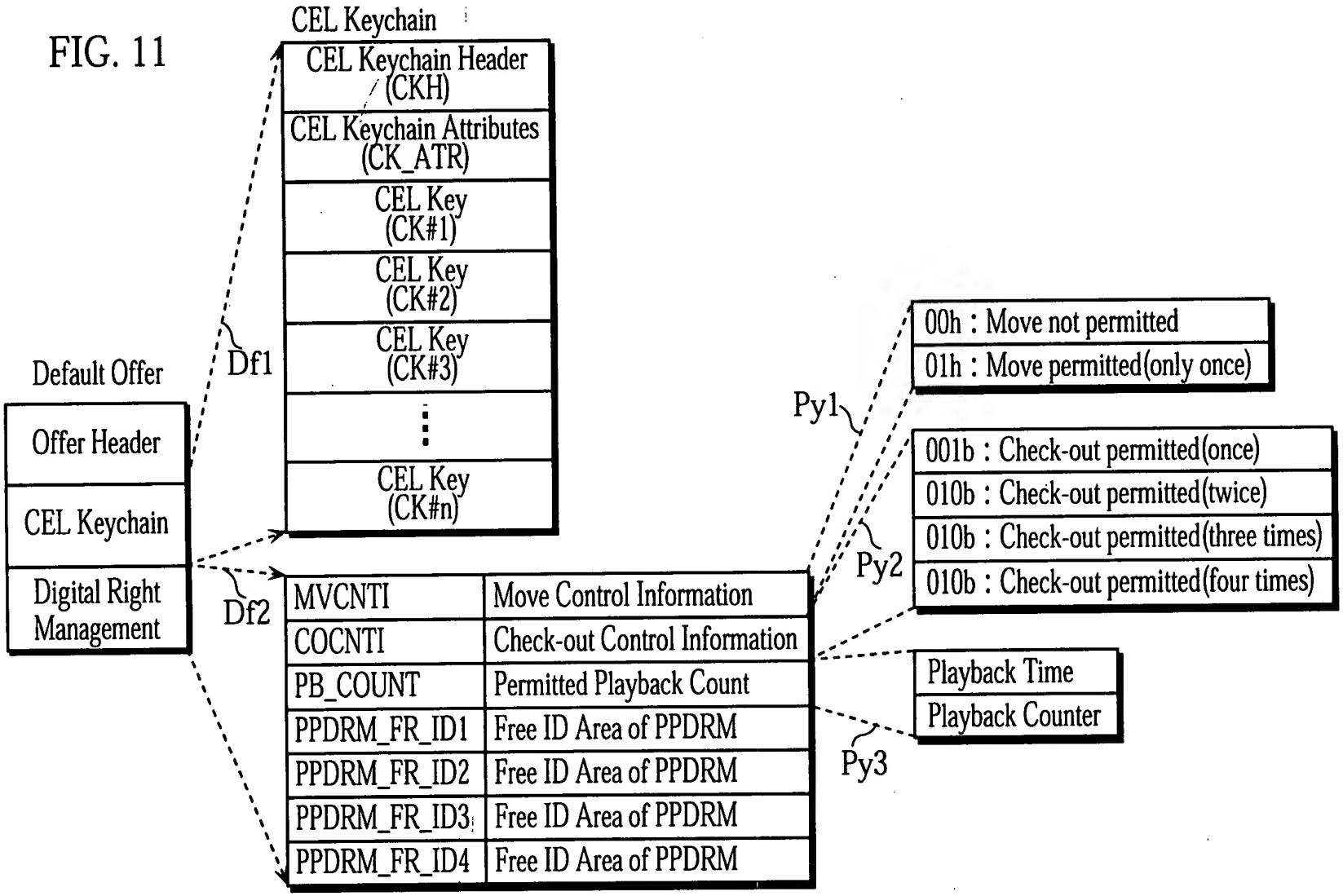

CEL Keychain
CEL Keychain Header (CKH)
CEL Keychain Attributes (CK_ATR)
CEL Key (CK#1)
CEL Key (CK#2)
CEL Key (CK#3)
CEL Key (CK#n)
Default Offer
Offer Header
CEL Keychain
Digital Right Management
Df1
Df2
MVCNTI
Move Control Information
COCNTI
Check-out Control Information
PB_COUNT
Permitted Playback Count
PPDRM_FR_ID1
Free ID Area of PPDRM
PPDRM_FR_ID2
Free ID Area of PPDRM
PPDRM_FR_ID3
Free ID Area of PPDRM
PPDRM_FR_ID4
Free ID Area of PPDRM
Py1
00h : Move not permitted
01h : Move permitted(only once)
Py2
001b : Check-out permitted(once)
010b : Check-out permitted(twice)
010b : Check-out permitted(three times)
010b : Check-out permitted(four times)
Py3
Playback Time
Playback Counter

FIG. 12

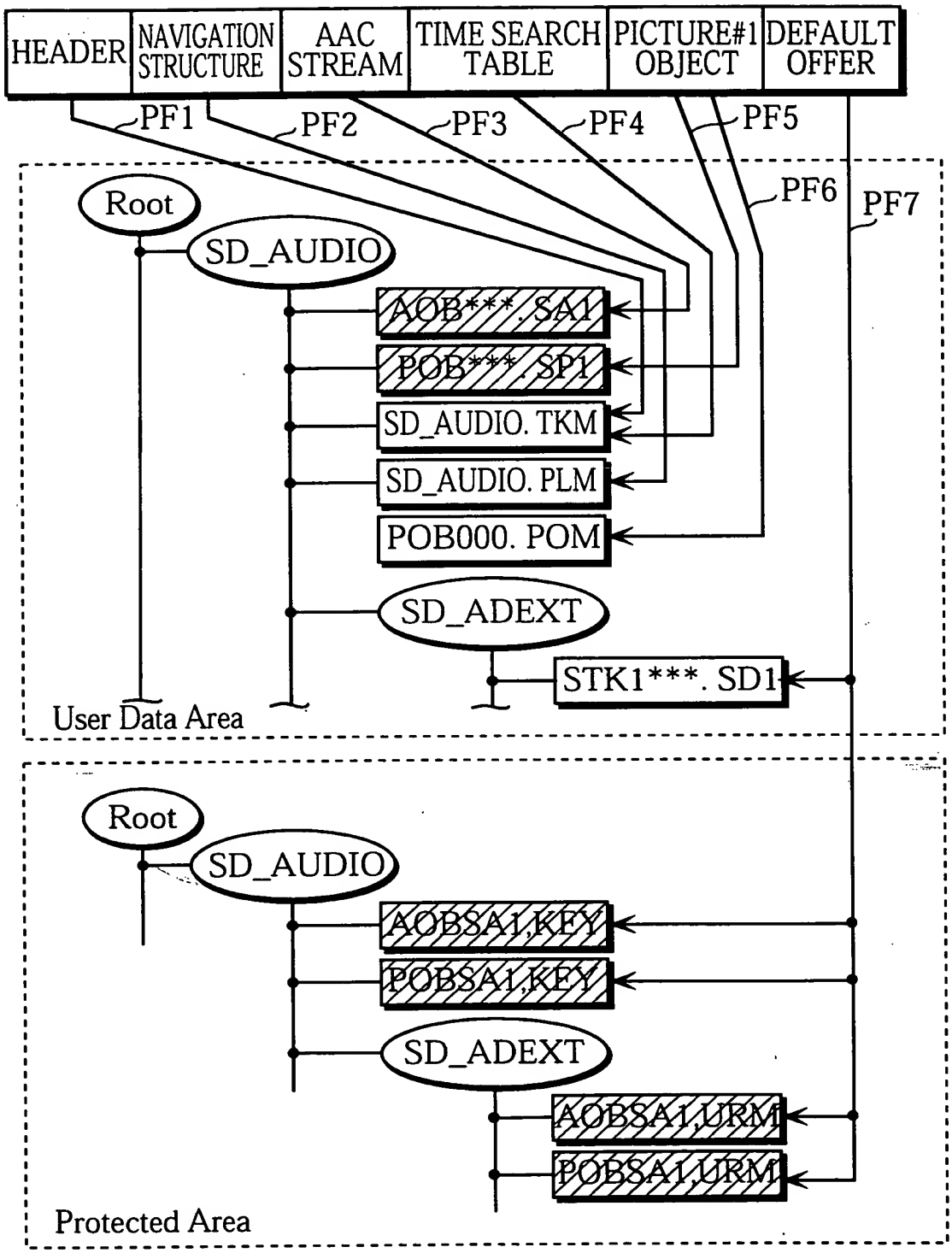

HEADER
NAVIGATION STRUCTURE
AAC STREAM
TIME SEARCH TABLE
PICTURE#1 OBJECT
DEFAULT OFFER
PF1
PF2
PF3
PF4
PF5
PF6
PF7
Root
SD_AUDIO
AOB***.SA1
POB***.SP1
SD_AUDIO.TKM
SD_AUDIO.PLM
POB000.POM
SD_ADEXT
STK1***.SD1
User Data Area
Root
SD_AUDIO
AOBSA1,KEY
POBSA1,KEY
SD_ADEXT
AOBSA1,URM
POBSA1,URM
Protected Area

FIG. 13

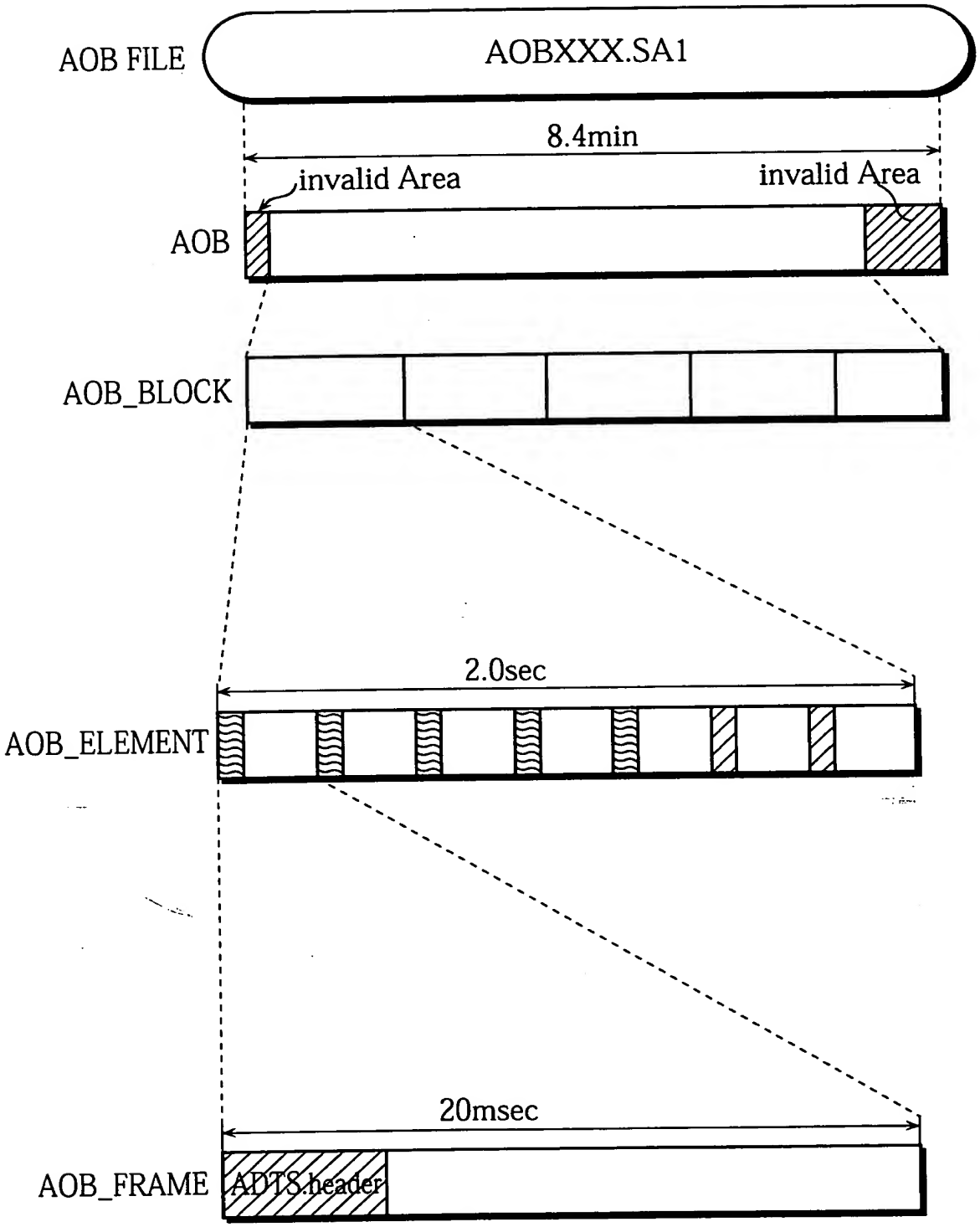

AOB FILE
AOBXXX.SA1
8.4min
invalid Area
invalid Area
AOB
AOB_BLOCK
2.0sec
AOB_ELEMENT
20msec
AOB_FRAME
ADTS.header

FIG. 14

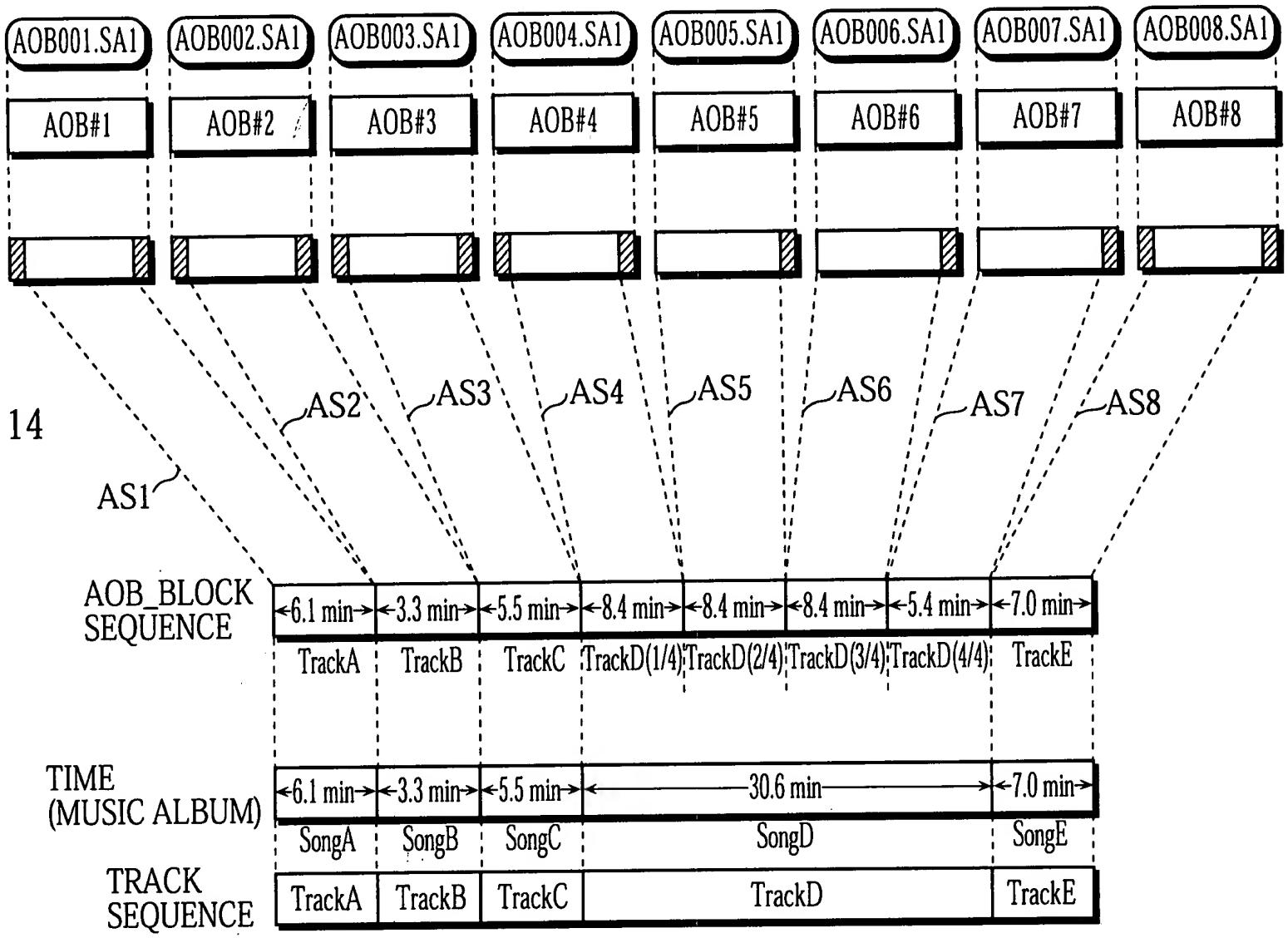

AOB001.SA1
AOB002.SA1
AOB003.SA1
AOB004.SA1
AOB005.SA1
AOB006.SA1
AOB007.SA1
AOB008.SA1
AOB#1
AOB#2
AOB#3
AOB#4
AOB#5
AOB#6
AOB#7
AOB#8
AS1
AS2
AS3
AS4
AS5
AS6
AS7
AS8
AOB_BLOCK SEQUENCE
6.1 min
3.3 min
5.5 min
8.4 min
8.4 min
8.4 min
5.4 min
7.0 min
TrackA
TrackB
TrackC
TrackD(1/4)
TrackD(2/4)
TrackD(3/4)
TrackD(4/4)
TrackE
TIME (MUSIC ALBUM)
6.1 min
3.3 min
5.5 min
30.6 min
7.0 min
SongA
SongB
SongC
SongD
SongE
TRACK SEQUENCE
TrackA
TrackB
TrackC
TrackD
TrackE

FIG. 15

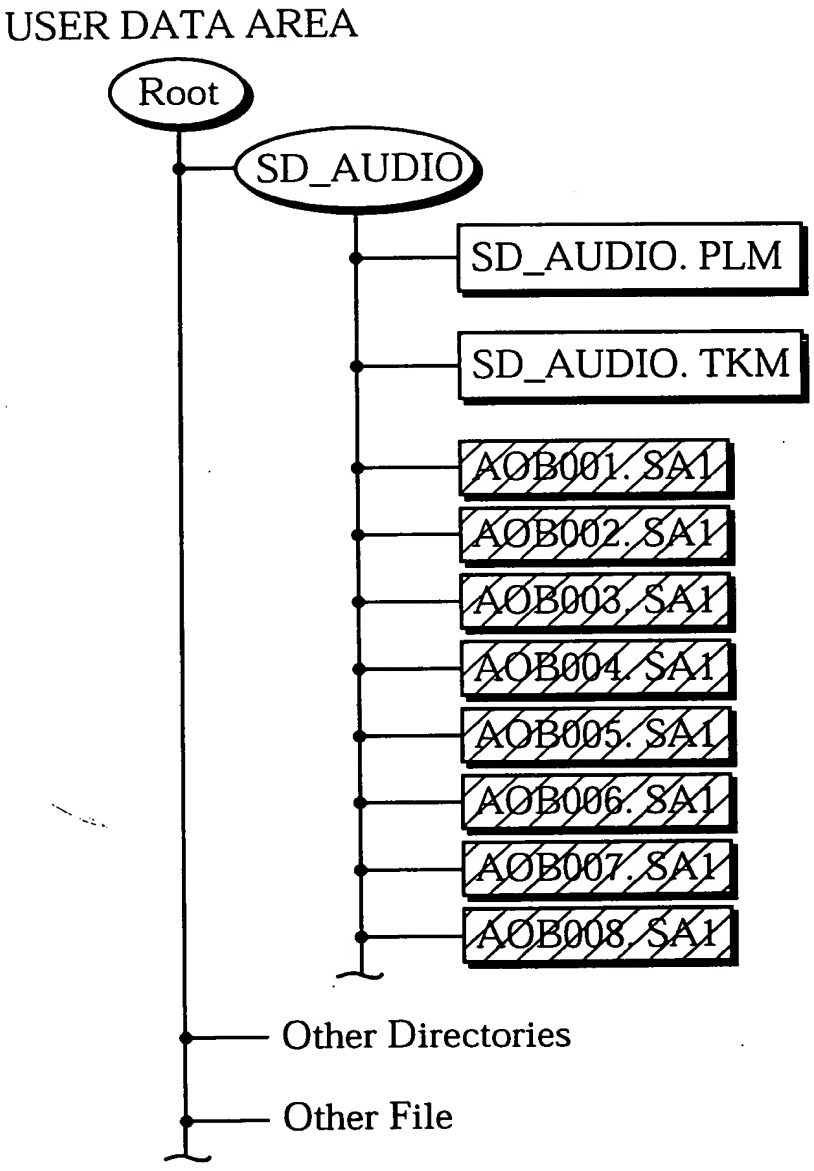

USER DATA AREA
Root
SD_AUDIO
SD_AUDIO. PLM
SD_AUDIO. TKM
AOB001. SA1
AOB002. SA1
AOB003. SA1
AOB004. SA1
AOB005. SA1
AOB006. SA1
AOB007. SA1
AOB008. SA1
Other Directories
Other File

FIG. 16A

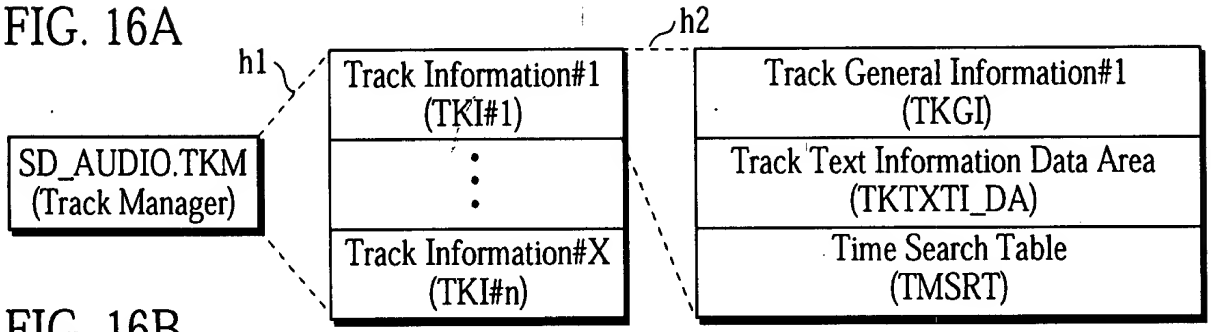


FIG. 16B

TKGI

TKI_ID	TKI Identifier
TKIN	TKI Number
TKI_BLK_ATR	Block Attribute of TKI
TKI_LNK_ATR	Link Pointer to next TKI
TKI_SZ	Size of TKI
TKI_PB_TM	Playback time of tracks
TKI_AOB_ATR	Audio Attribute of TKI
TKI_POB_ATR	Picture Attribute of TKI
TKI_T11_ATR	Attribute of Text1
TKI_T12_ATR	Attribute of Text2
TKI_TMSRT_SA	Start Address of TMSRT
ISRC	ISRC code
TKI_APP_ATR	TKI application attributes
BIT	Block Information Table
TKI_POB_SRP	TKI_POB Search Pointers(4b*20)

DATA_OFFSET	FIRST ADDRESS OF AOB_BLOCK
SZ_DATA	DATA LENGTH OF AOB_BLOCK
FNs_1st_TMSRTE	NUMBER OF AOB_FRAMES IN FIRST AOB_ELEMENT
FNs_Last_TMSRTE	NUMBER OF AOB_FRAMES IN LAST AOB_ELEMENT
FNs_Middle_TMSRTE	NUMBER OF AOB_FRAMES IN AOB_ELEMENT
TIME_LENGTH	TIME LENGTH OF AOB_ELEMENT

0070801 9TH5960

FIG. 17

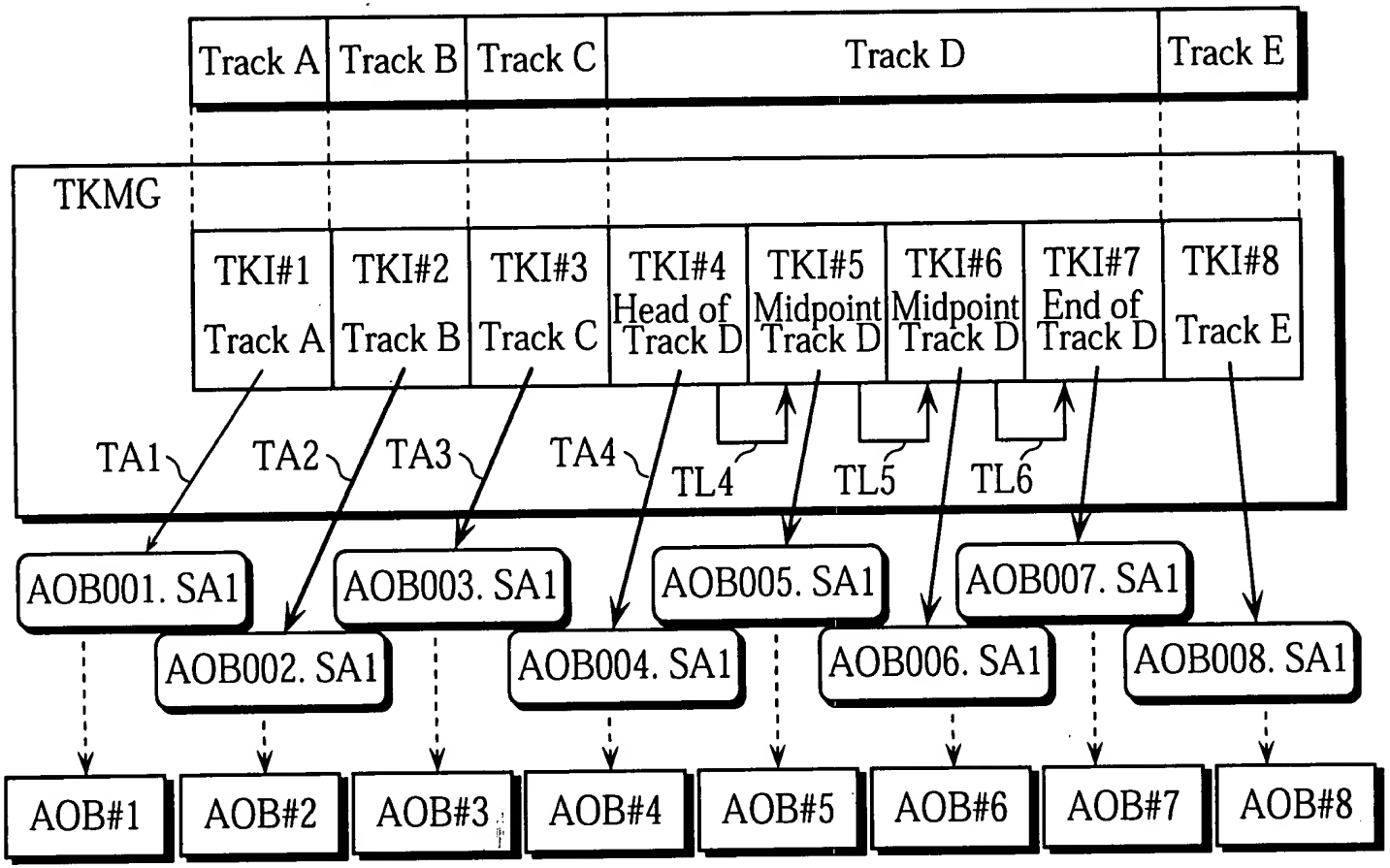


FIG. 18A

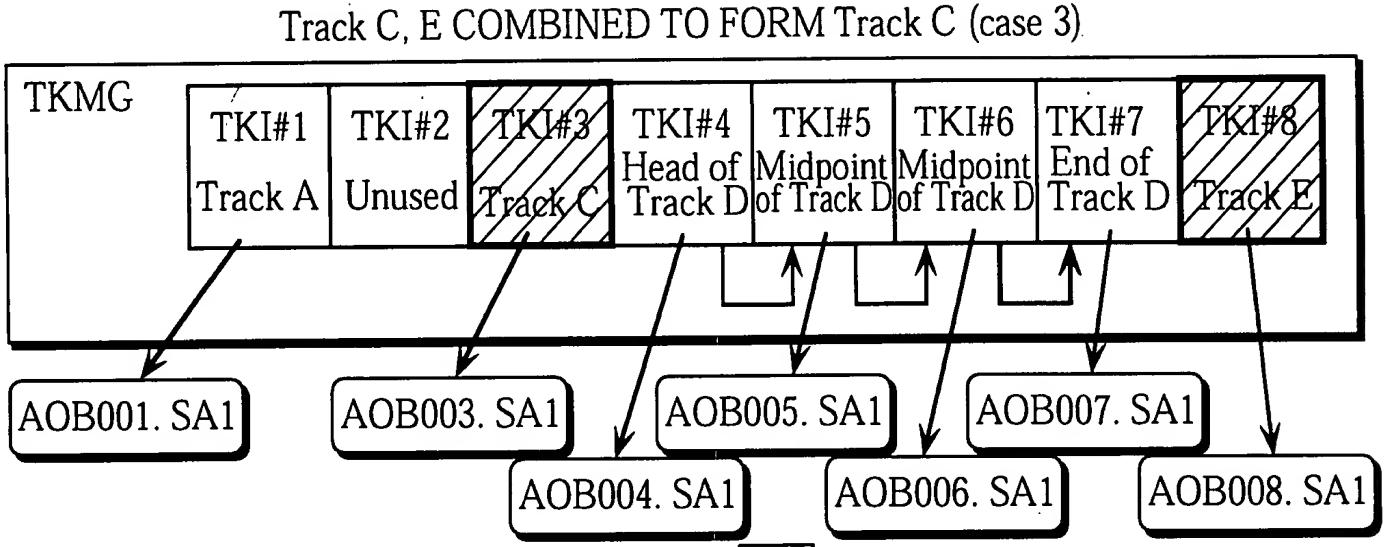


FIG. 18B

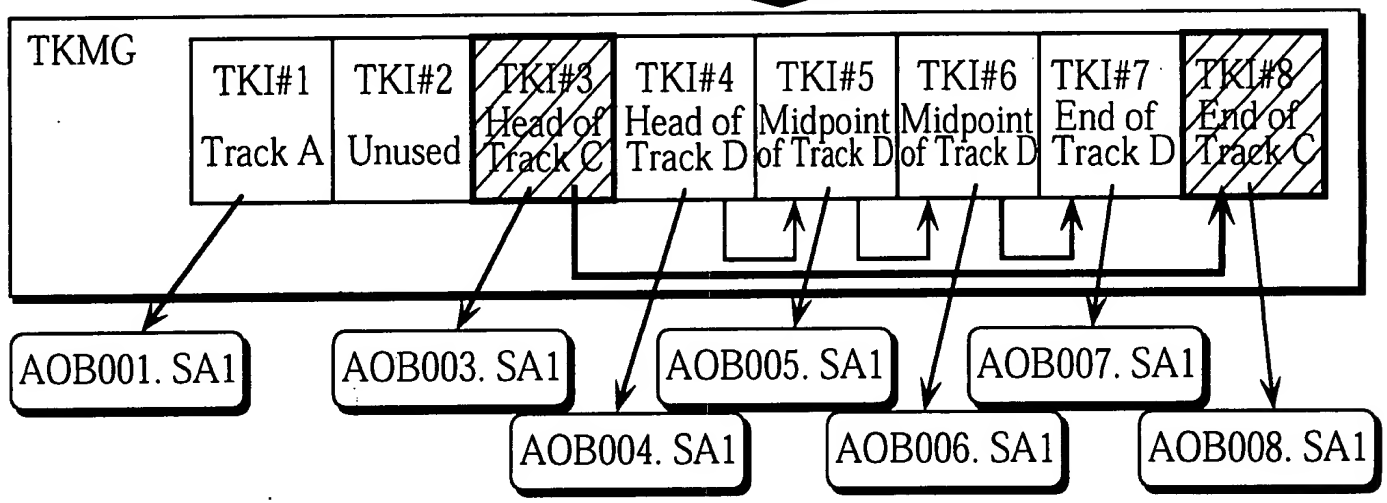


FIG. 19A

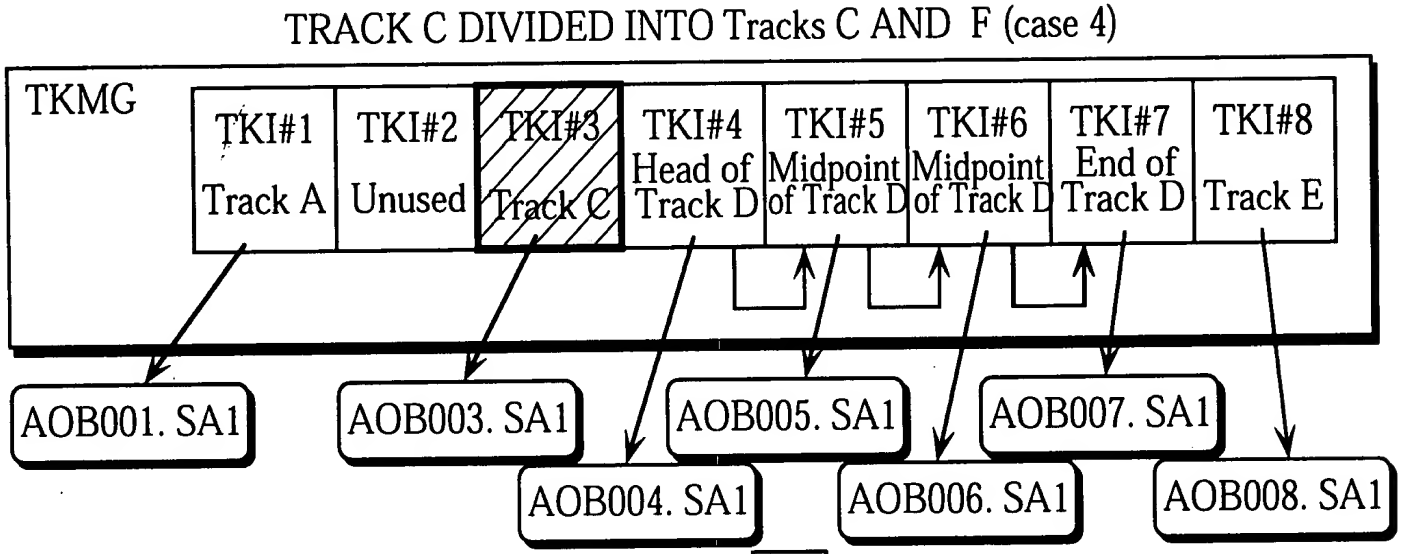


FIG. 19B

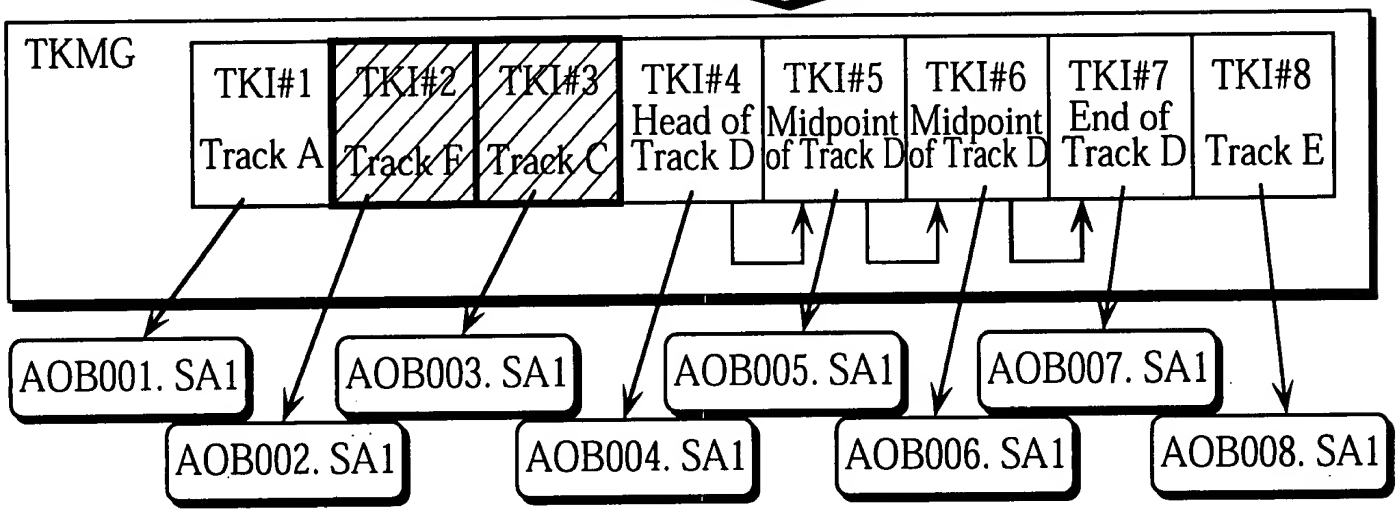


FIG. 20

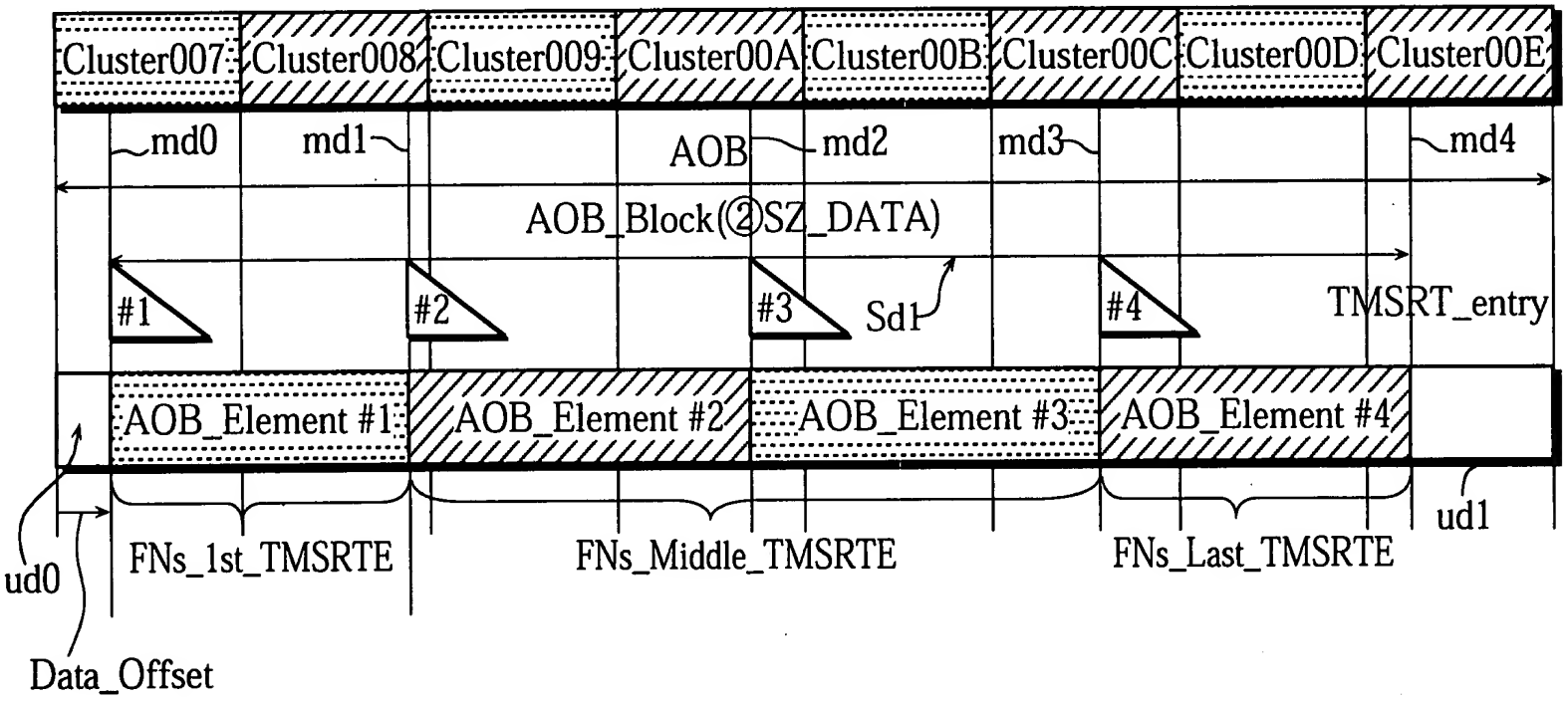

Cluster007
Cluster008
Cluster009
Cluster00A
Cluster00B
Cluster00C
Cluster00D
Cluster00E
md0
md1
AOB
md2
md3
md4
AOB_Block(②SZ_DATA)
#1
#2
#3
Sd1
#4
TMSRT_entry
AOB_Element #1
AOB_Element #2
AOB_Element #3
AOB_Element #4
ud1
ud0
FNs_1st_TMSRTE
FNs_Middle_TMSRTE
FNs_Last_TMSRTE
Data_Offset

FIG. 21

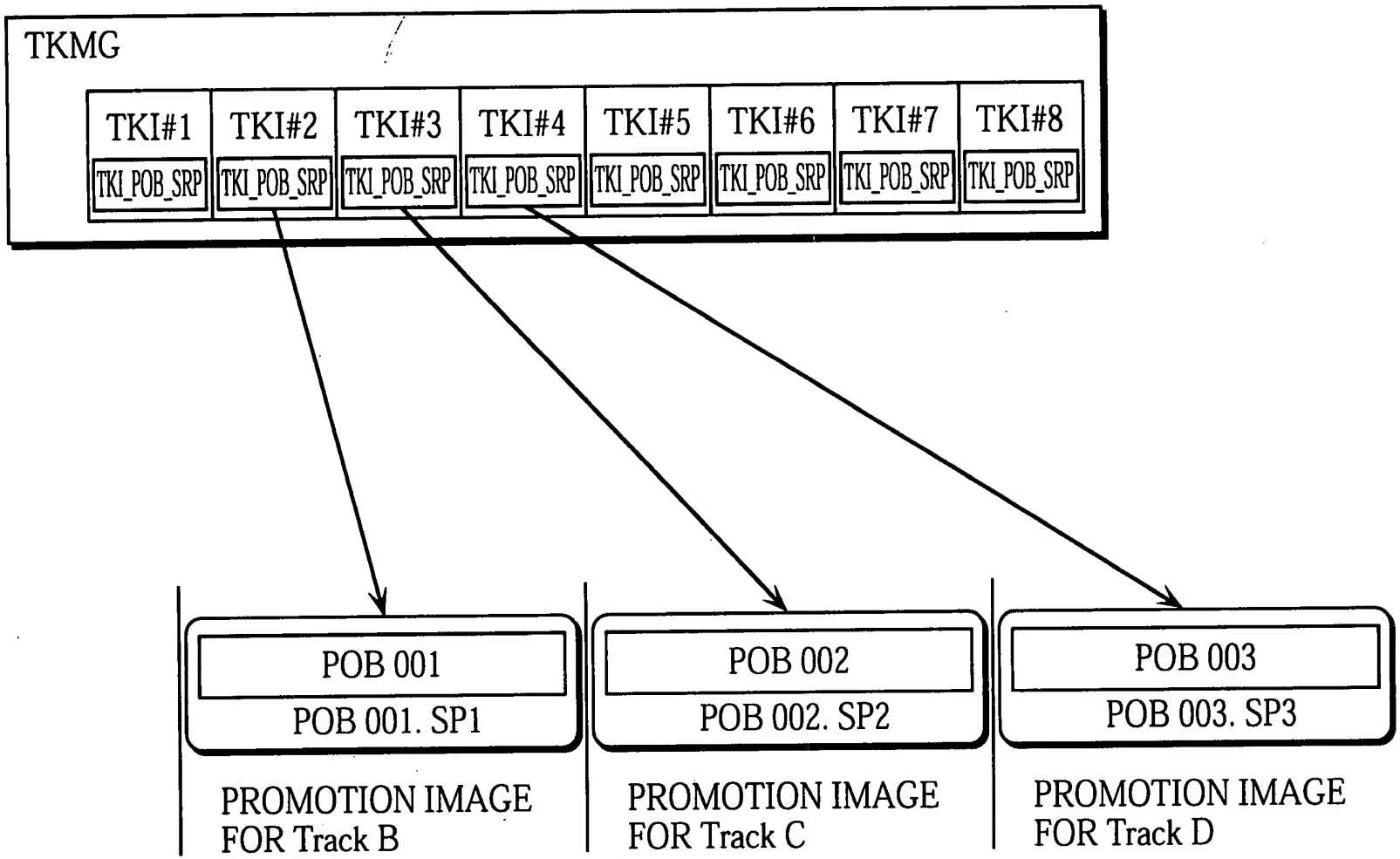

TKMG
TKI#1
TKI#2
TKI#3
TKI#4
TKI#5
TKI#6
TKI#7
TKI#8
TKI_POB_SRP
TKI_POB_SRP
TKI_POB_SRP
TKI_POB_SRP
TKI_POB_SRP
TKI_POB_SRP
TKI_POB_SRP
TKI_POB_SRP
POB 001
POB 001. SP1
POB 002
POB 002. SP2
POB 003
POB 003. SP3
PROMOTION IMAGE FOR Track B
PROMOTION IMAGE FOR Track C
PROMOTION IMAGE FOR Track D

FIG. 22

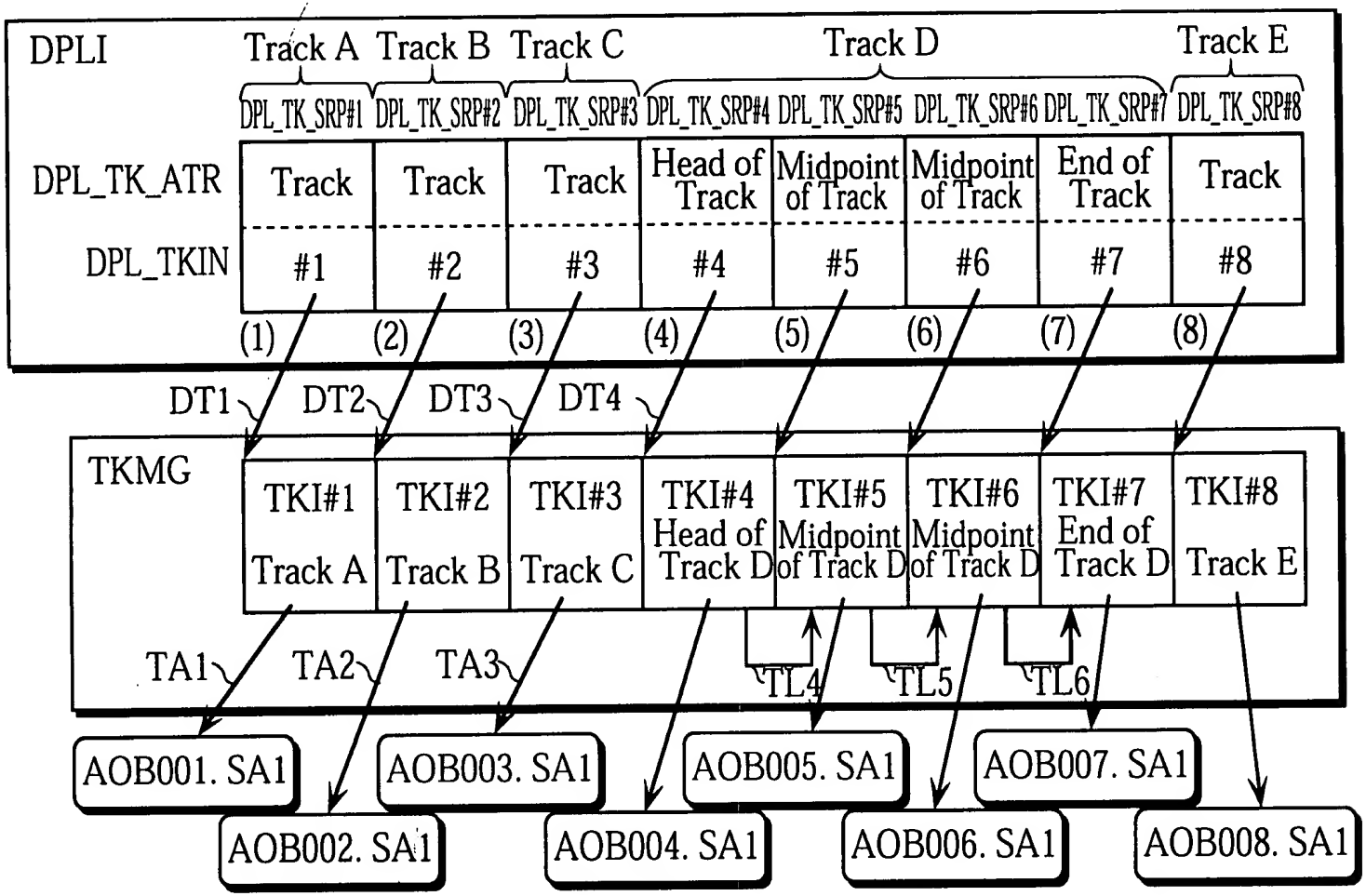

DPLI
Track A
Track B
Track C
Track D
Track E
DPL_TK_SRP#1
DPL_TK_SRP#2
DPL_TK_SRP#3
DPL_TK_SRP#4
DPL_TK_SRP#5
DPL_TK_SRP#6
DPL_TK_SRP#7
DPL_TK_SRP#8
DPL_TK_ATR
Track
Track
Track
Head of Track
Midpoint of Track
Midpoint of Track
End of Track
Track
DPL_TKIN
#1
#2
#3
#4
#5
#6
#7
#8
(1)
(2)
(3)
(4)
(5)
(6)
(7)
(8)
DT1
DT2
DT3
DT4
TKMG
TKI#1 Track A
TKI#2 Track B
TKI#3 Track C
TKI#4 Head of Track D
TKI#5 Midpoint of Track D
TKI#6 Midpoint of Track D
TKI#7 End of Track D
TKI#8 Track E
TA1
TA2
TA3
TL4
TL5
TL6
AOB001. SA1
AOB002. SA1
AOB003. SA1
AOB004. SA1
AOB005. SA1
AOB006. SA1
AOB007. SA1
AOB008. SA1

FIG. 23A

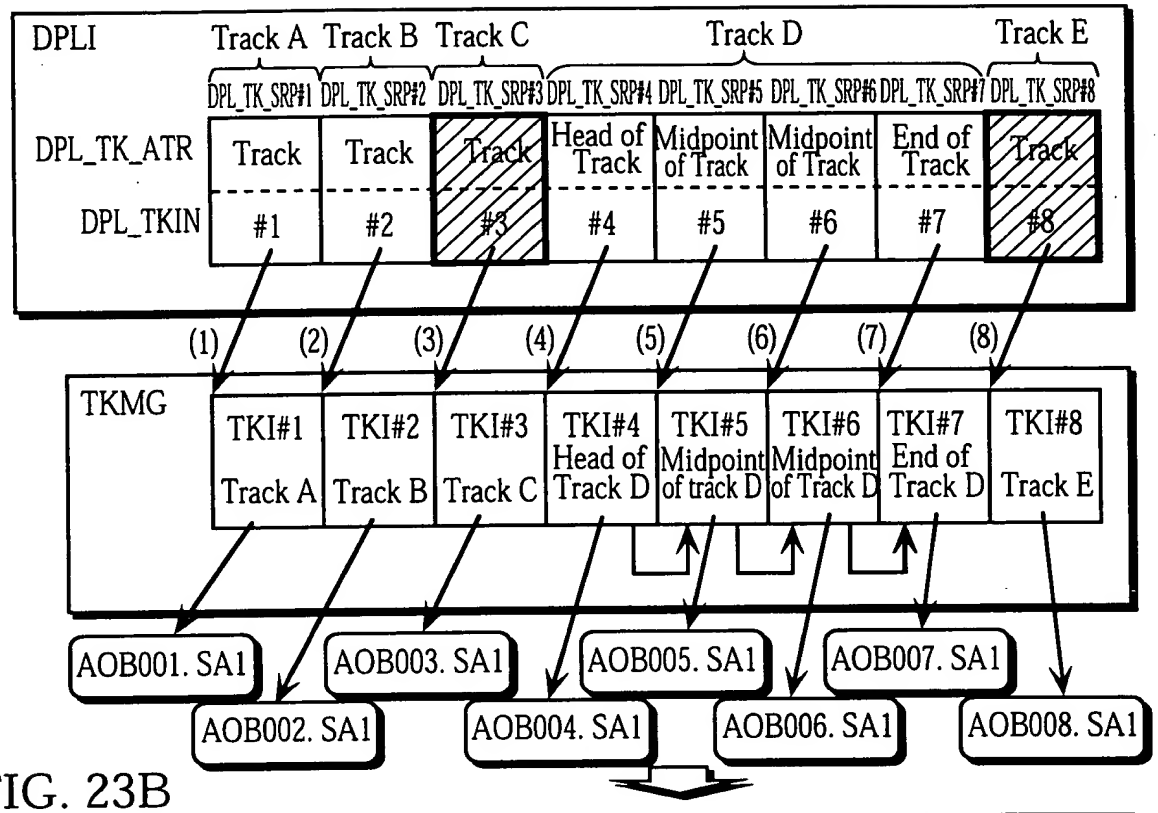
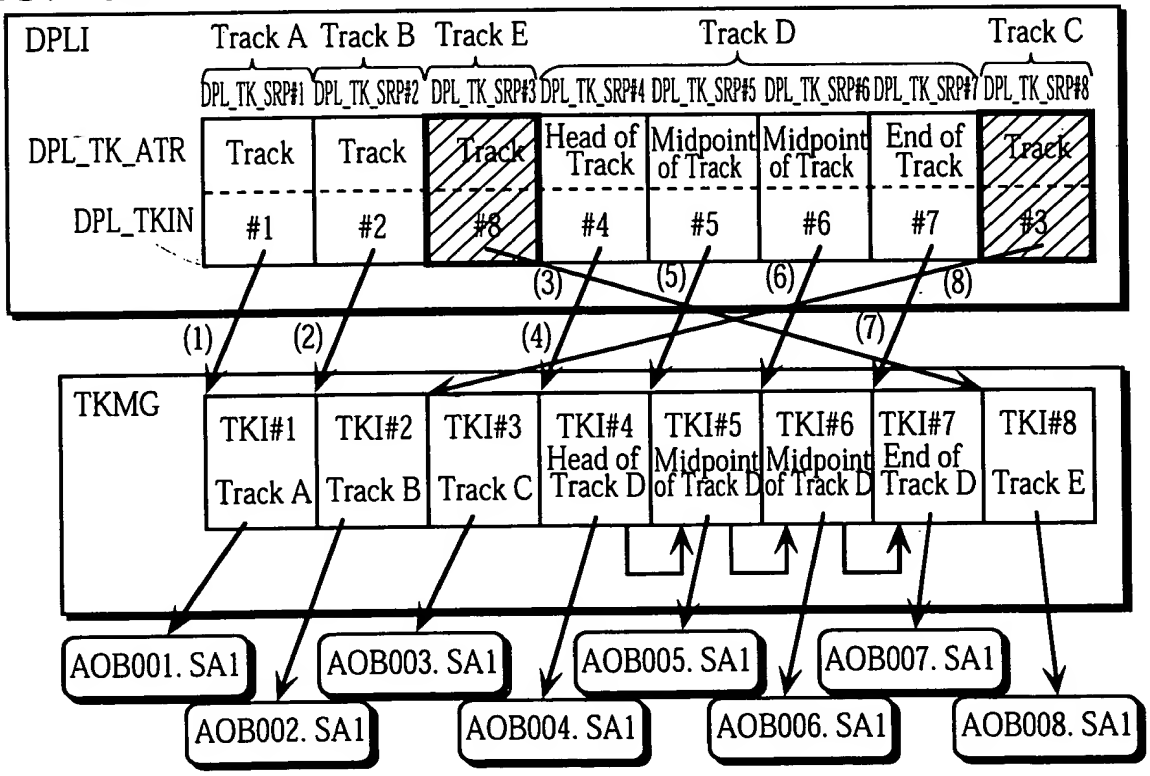


FIG. 23B



0075345-0960

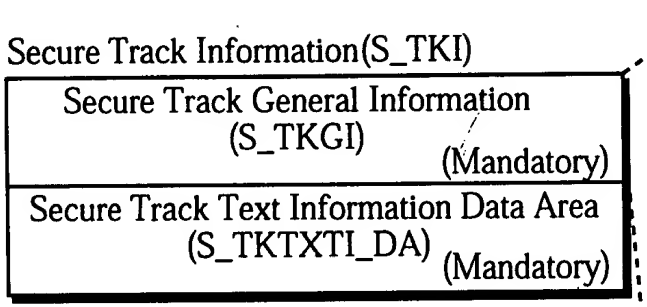


FIG. 24

S_TKI_ID	S_TKI Identifier
S_TKIN	S_TKI Number
S_TKI_BLK_ATR	Block Attribute of S_TKI
S_TKI_LNK_ATR	Link Pointer to next S_TKI
S_TKI_SZ	Size of S_TKI
S_TKI_PB_TM	Playback time of Track
S_TKI_AOB_ATR	Audio Attribute of S_TKI
reserved	reserved
S_TKI_POB_ATR	Picture Attribute of TKI
reserved	reserved
reserved	Reserved for copyright management Information
reserved	reserved
S_TKI_T11_ATR	Attribute of Text1
S_TKI_T12_ATR	Attribute of Text2
reserved	reserved
S_TKI_ISRC	ISRC code
S_TKI_APP_ATR	S_TKI application attributes
reserved	reserved
S_TKI_FR_ID1	Free ID Area of S_TKI
S_TKI_FR_ID2	Free ID Area of S_TKI
S_TKI_FR_ID3	Free ID Area of S_TKI
S_TKI_FR_ID4	Free ID Area of S_TKI
reserved	reserved
S_TKI_POB_SRP	S_TKI_POB Search Pointers(4B*20)

FIG. 25

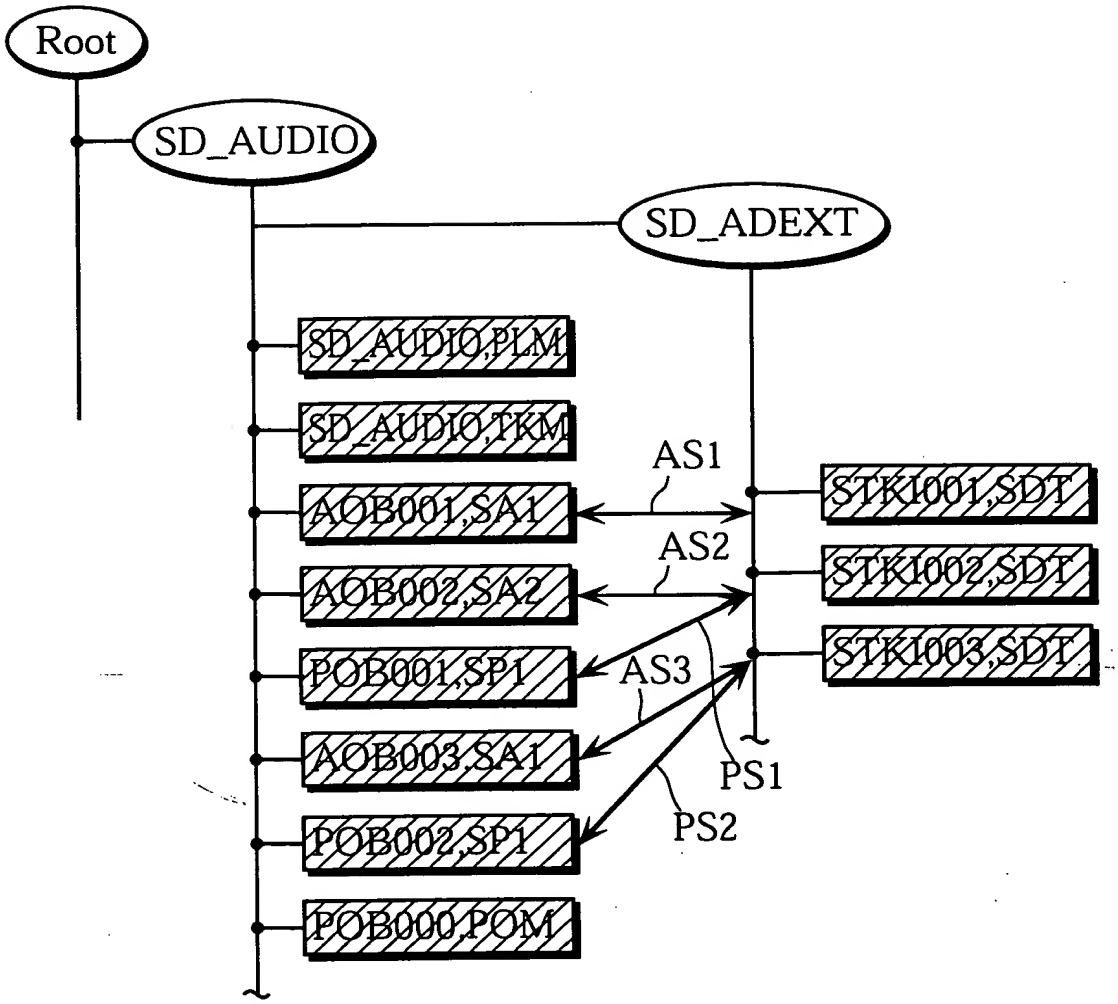

Root
SD_AUDIO
SD_ADEXT
SD_AUDIO,PLM
SD_AUDIO,TKM
AOB001,SA1
AOB002,SA2
POB001,SP1
AOB003,SA1
POB002,SP1
POB000,POM
STK1001,SDT
STK1002,SDT
STK1003,SDT
AS1
AS2
AS3
PS1
PS2

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FIG. 26

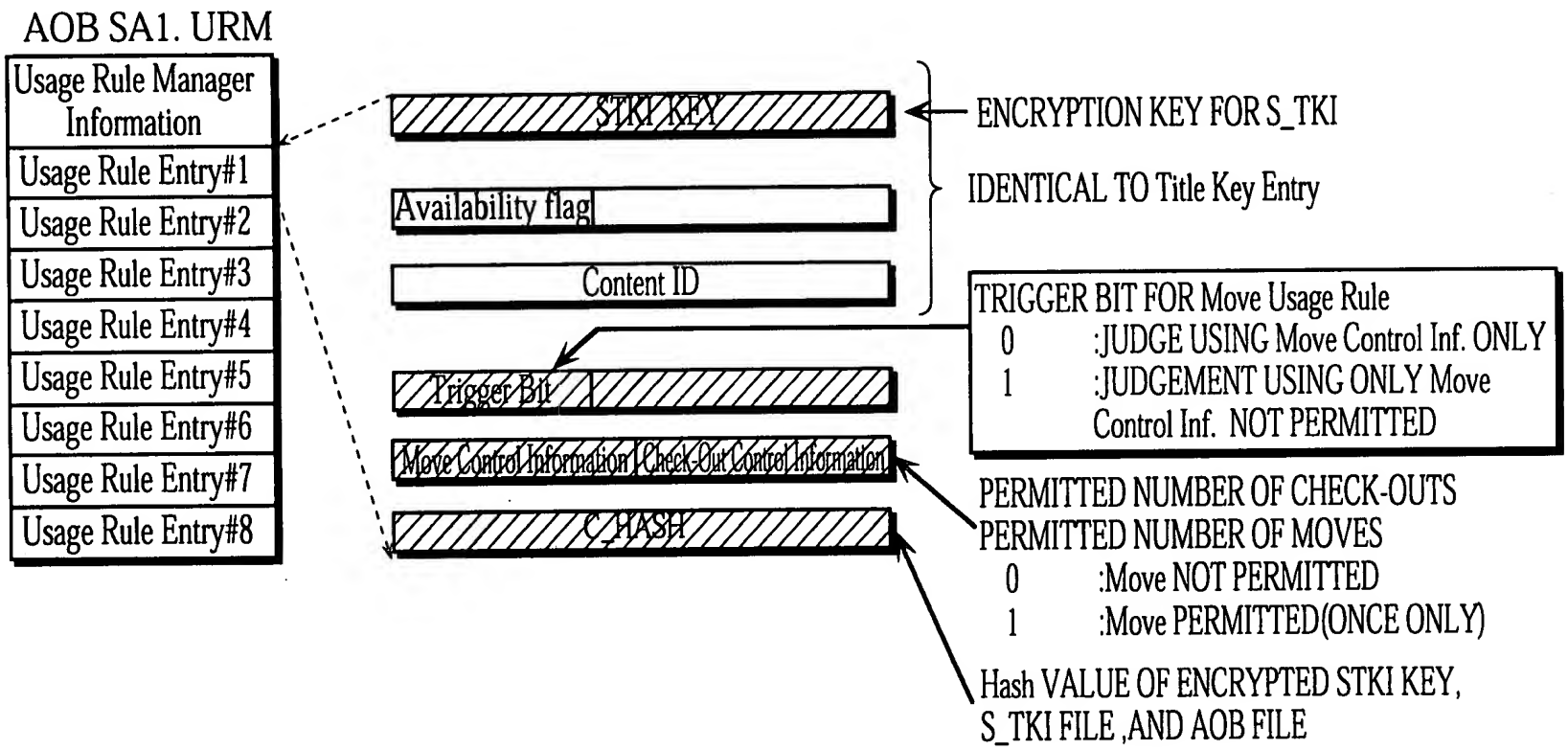

FIG. 27

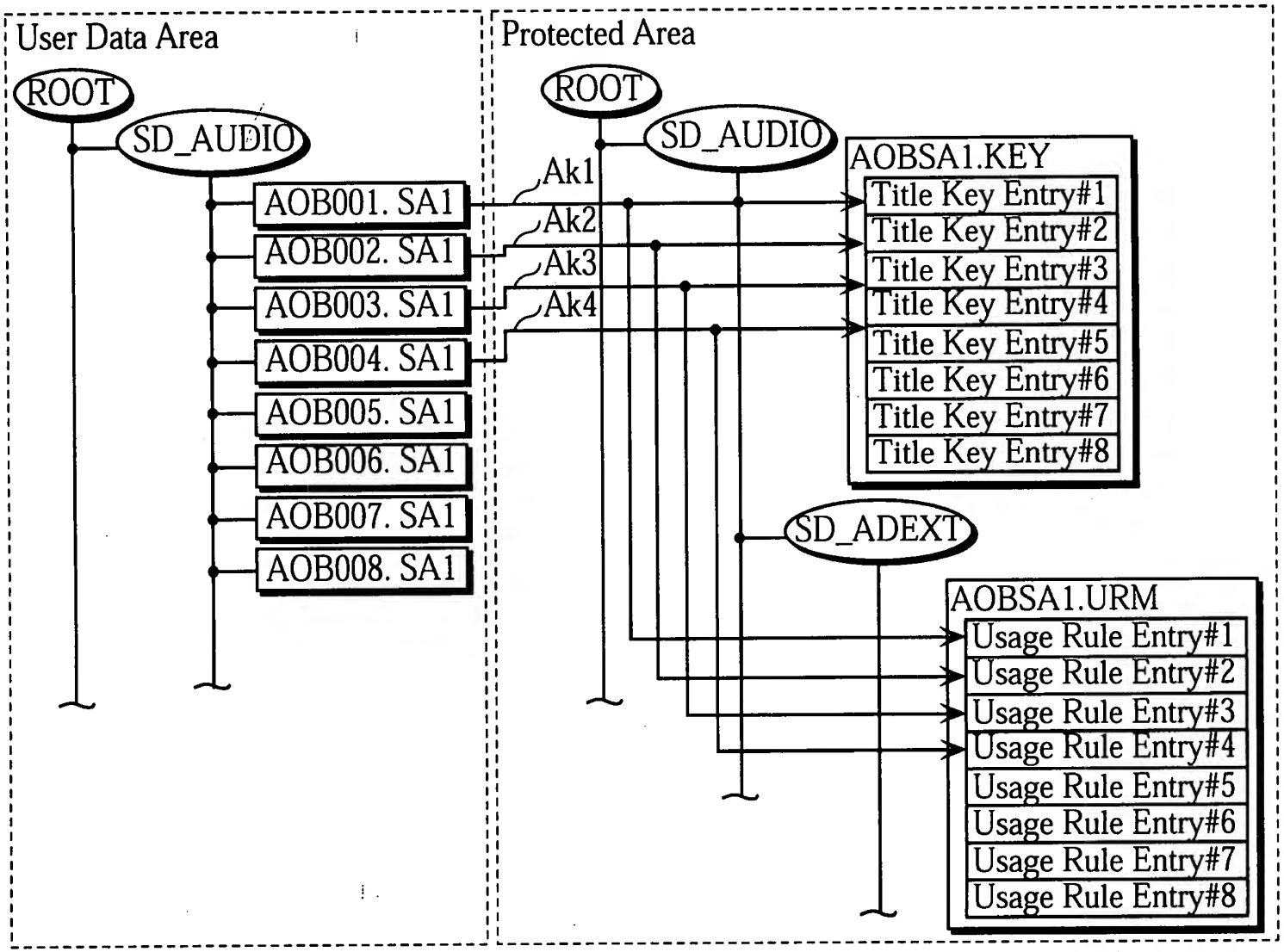
User Data Area
ROOT
SD_AUDIO
AOB001. SA1
AOB002. SA1
AOB003. SA1
AOB004. SA1
AOB005. SA1
AOB006. SA1
AOB007. SA1
AOB008. SA1
Protected Area
ROOT
SD_AUDIO
Ak1
Ak2
Ak3
Ak4
AOBSA1.KEY
Title Key Entry#1
Title Key Entry#2
Title Key Entry#3
Title Key Entry#4
Title Key Entry#5
Title Key Entry#6
Title Key Entry#7
Title Key Entry#8
SD_ADEXT
AOBSA1.URM
Usage Rule Entry#1
Usage Rule Entry#2
Usage Rule Entry#3
Usage Rule Entry#4
Usage Rule Entry#5
Usage Rule Entry#6
Usage Rule Entry#7
Usage Rule Entry#8

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FIG. 28A

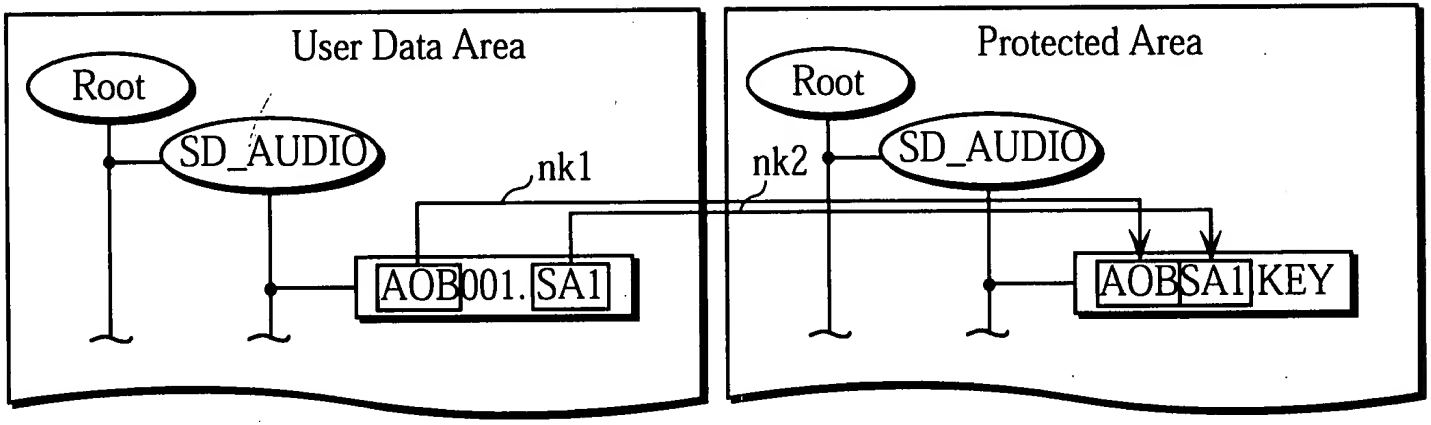

FIG. 28B

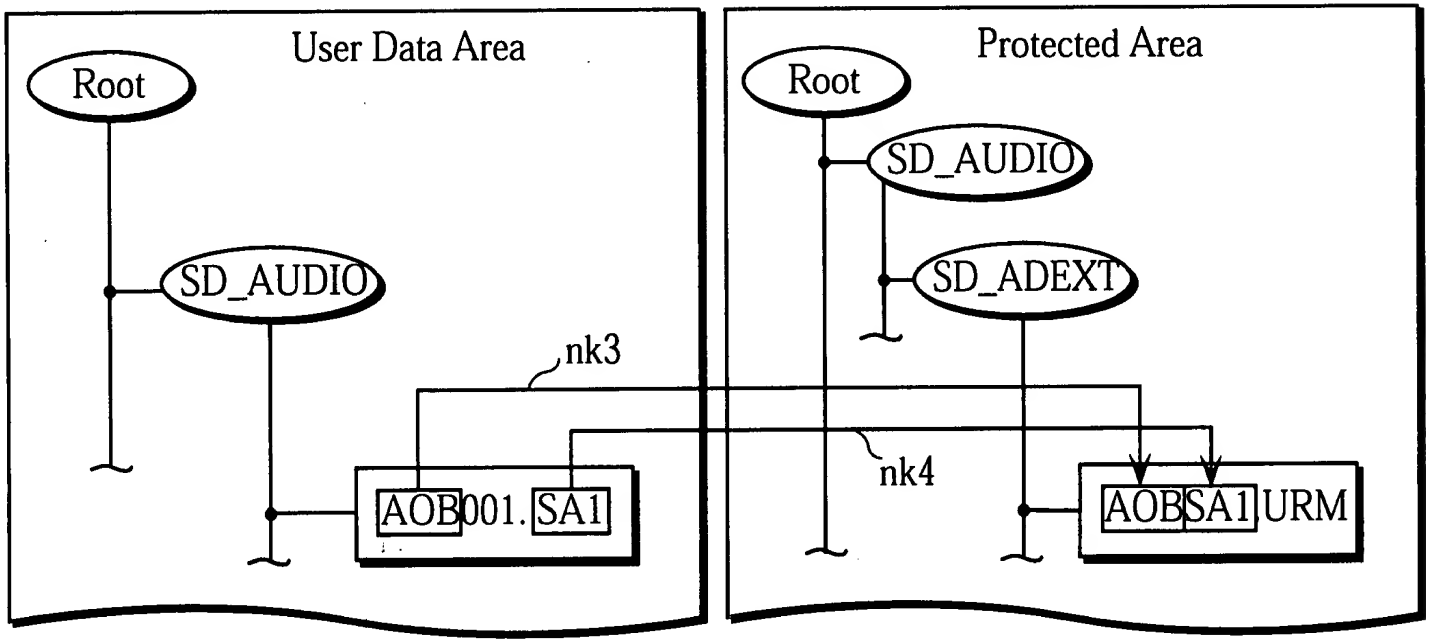

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FIG. 29

AOBSA1.KEY Title Key Entry

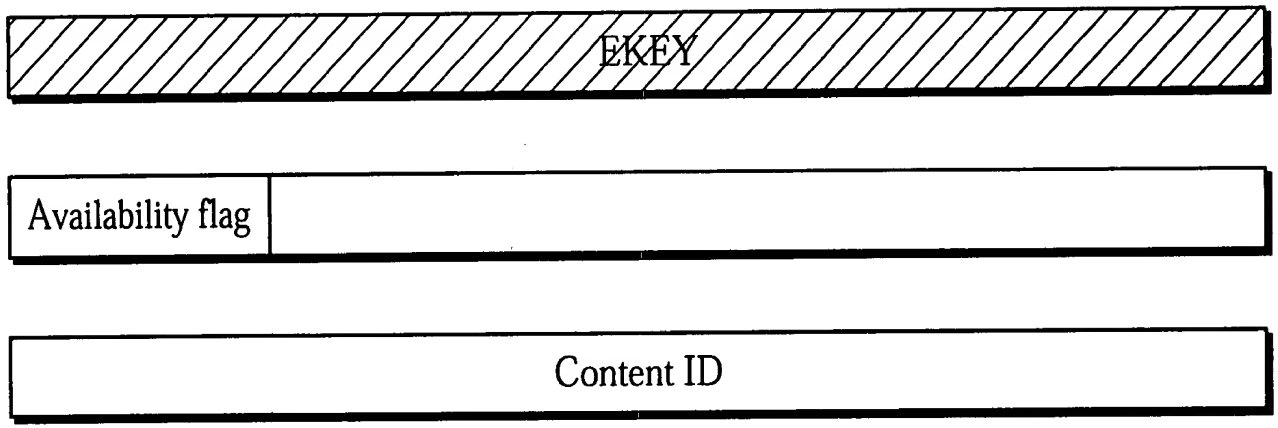

FIG. 30A

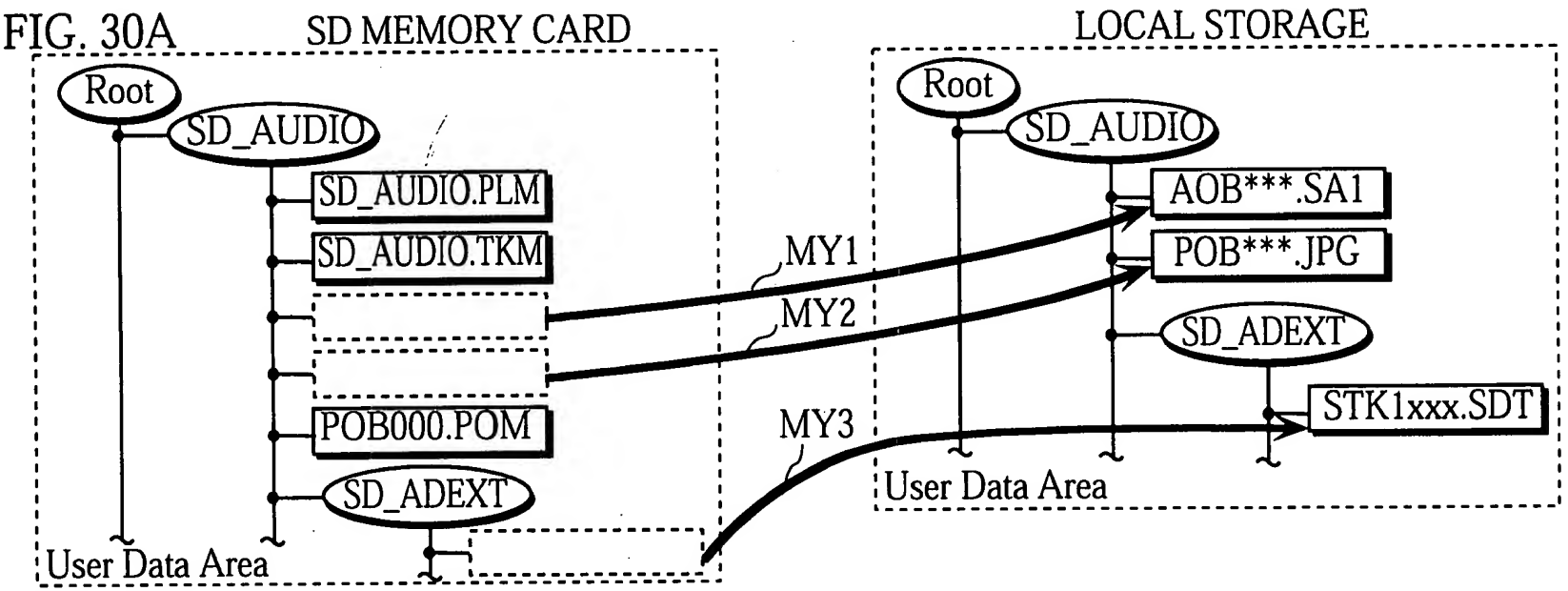

FIG. 30B

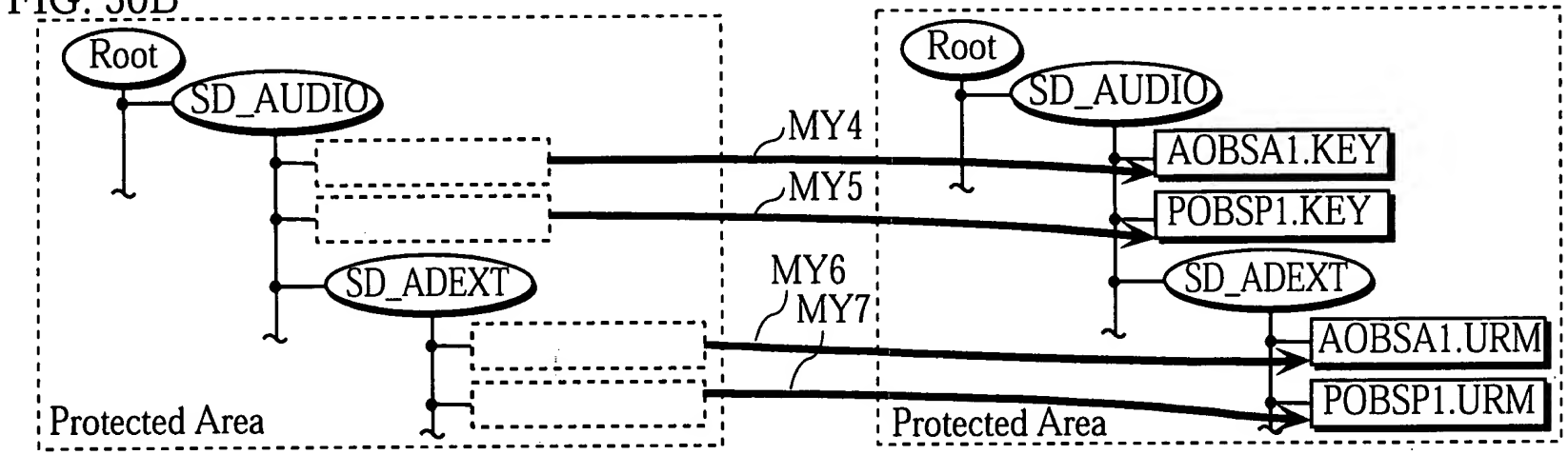

FIG. 31A

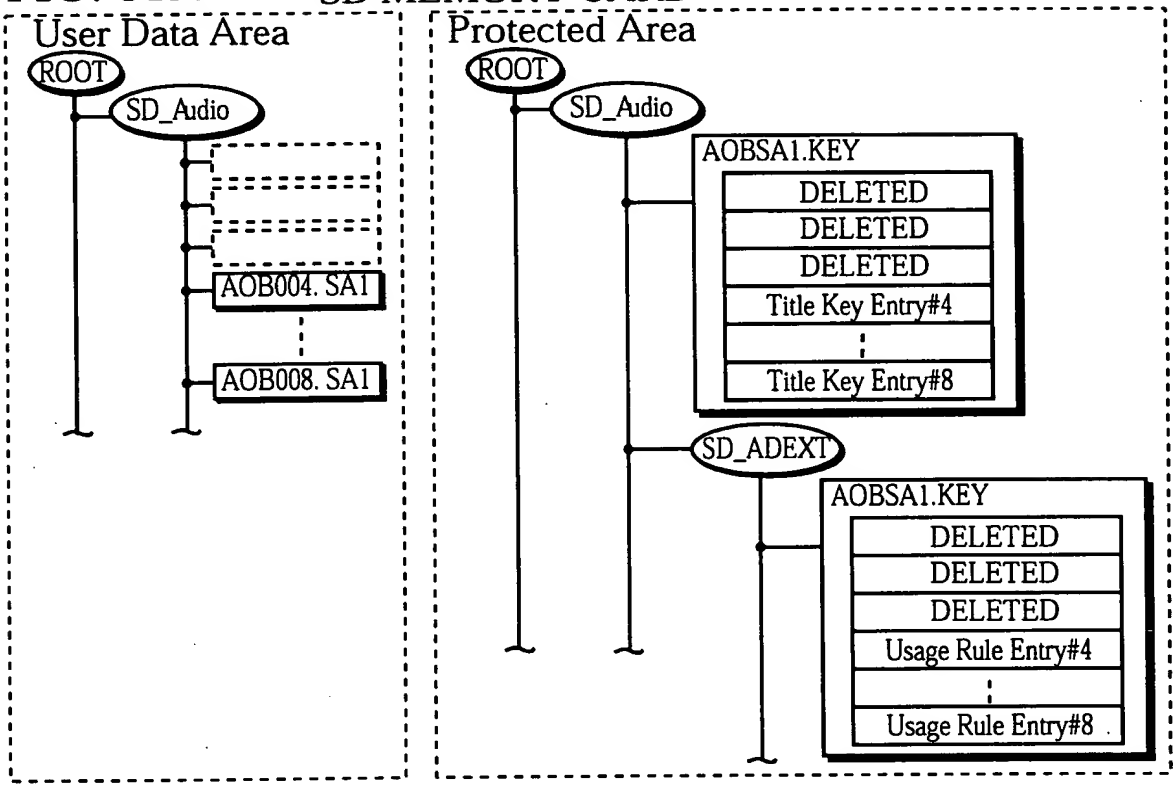

FIG. 31B

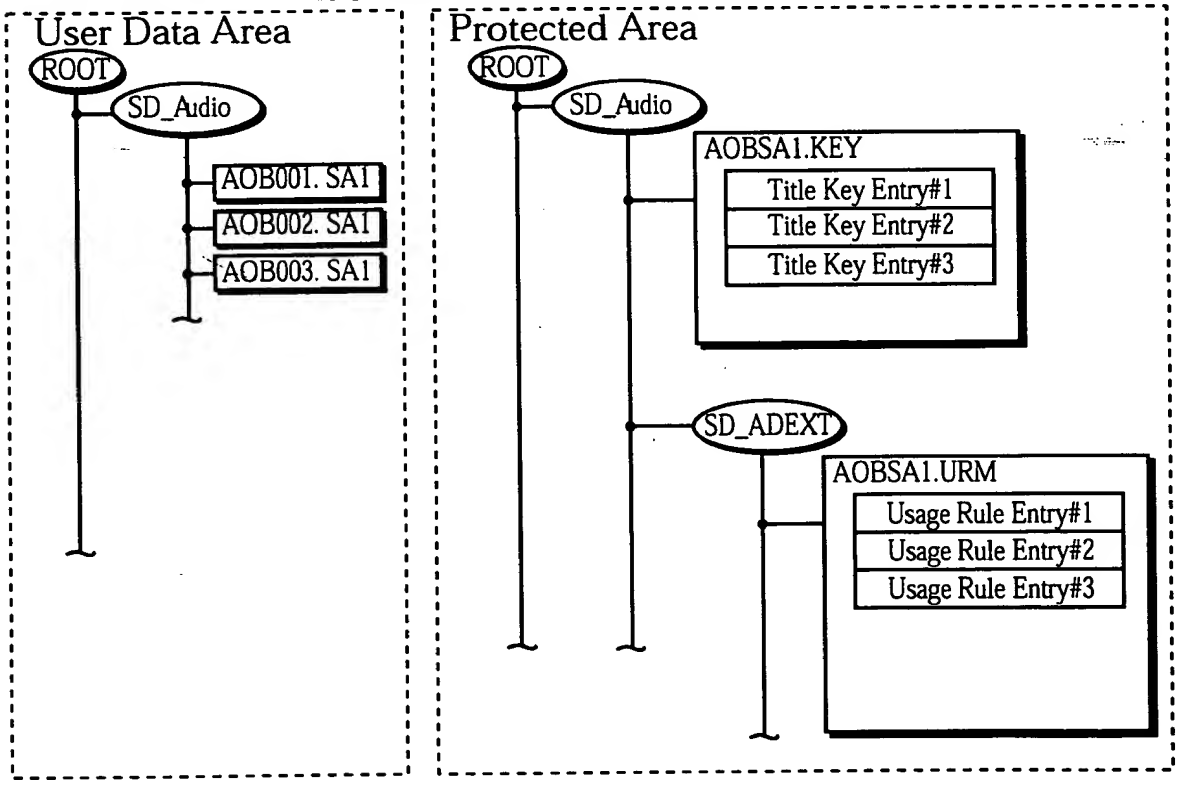

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FIG. 32

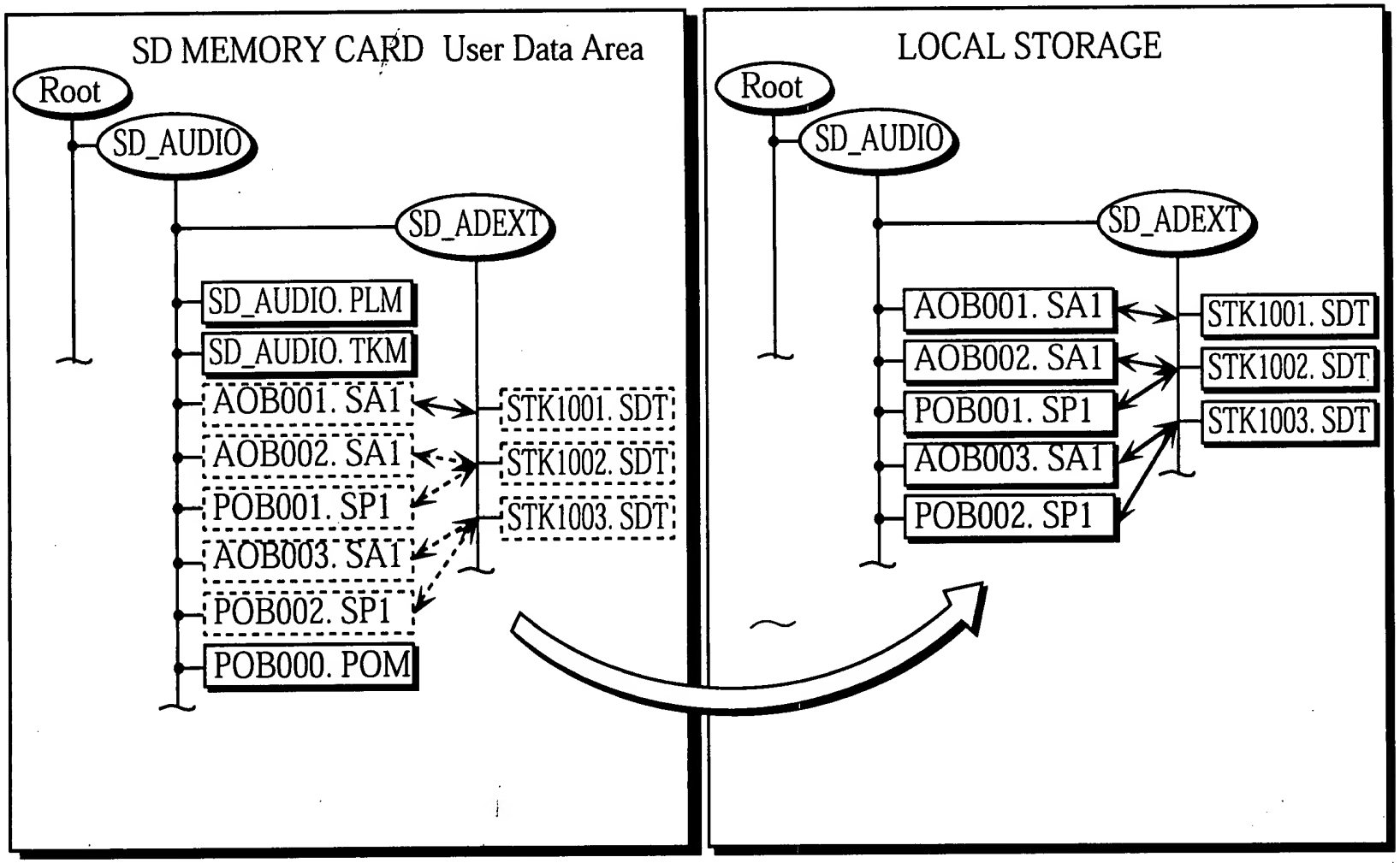
SD MEMORY CARD User Data Area
Root
SD_AUDIO
SD_ADEXT
SD_AUDIO. PLM
SD_AUDIO. TKM
AOB001. SA1
AOB002. SA1
POB001. SP1
AOB003. SA1
POB002. SP1
POB000. POM
STK1001. SDT
STK1002. SDT
STK1003. SDT
LOCAL STORAGE
Root
SD_AUDIO
SD_ADEXT
AOB001. SA1
AOB002. SA1
POB001. SP1
AOB003. SA1
POB002. SP1
STK1001. SDT
STK1002. SDT
STK1003. SDT

FIG. 33

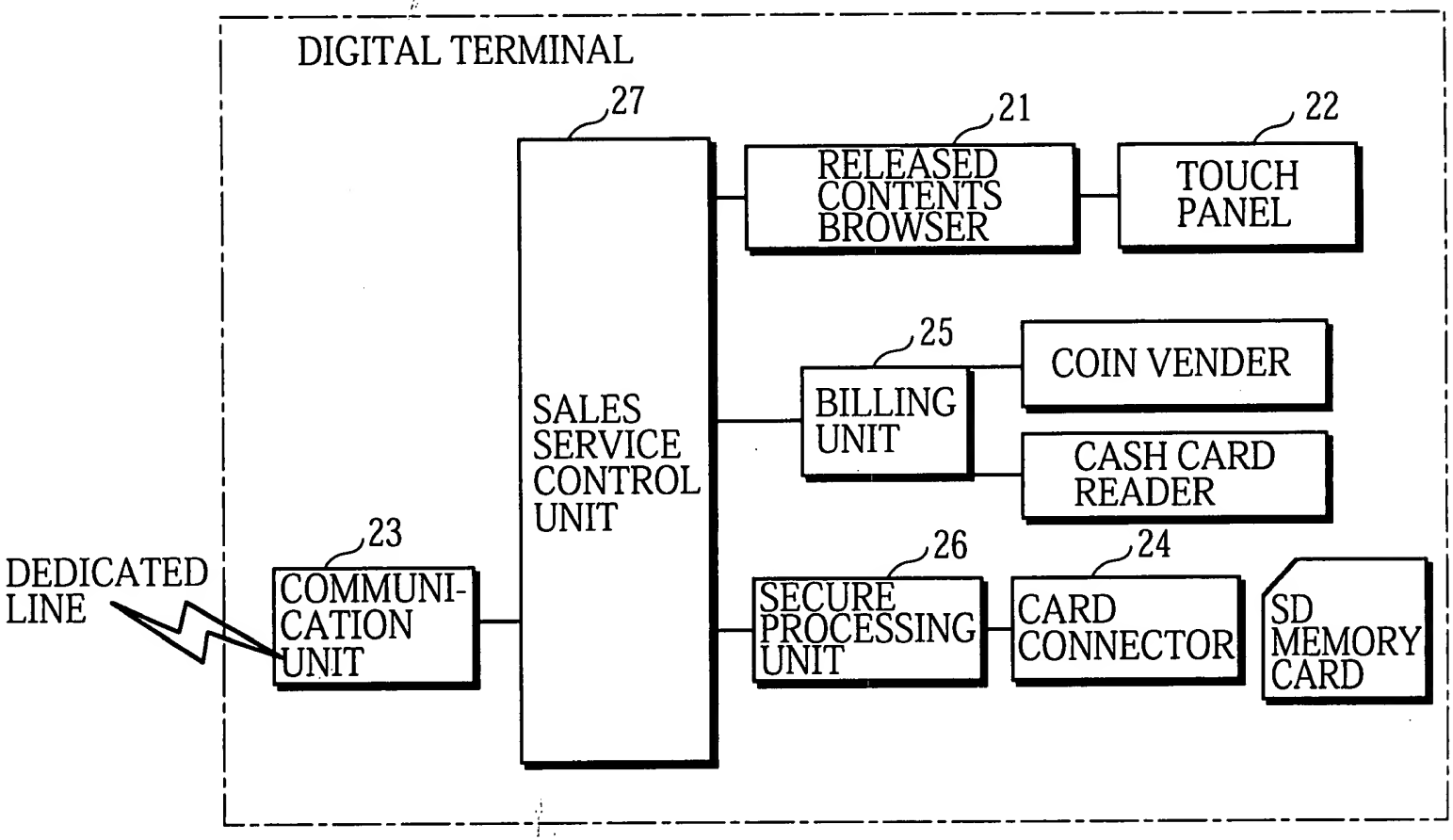
DIGITAL TERMINAL
27
21
22
RELEASED CONTENTS BROWSER
TOUCH PANEL
25
COIN VENDER
BILLING UNIT
SALES SERVICE CONTROL UNIT
CASH CARD READER
23
26
24
DEDICATED LINE
COMMUNI-CATION UNIT
SECURE PROCESSING UNIT
CARD CONNECTOR
SD MEMORY CARD

FIG. 34A

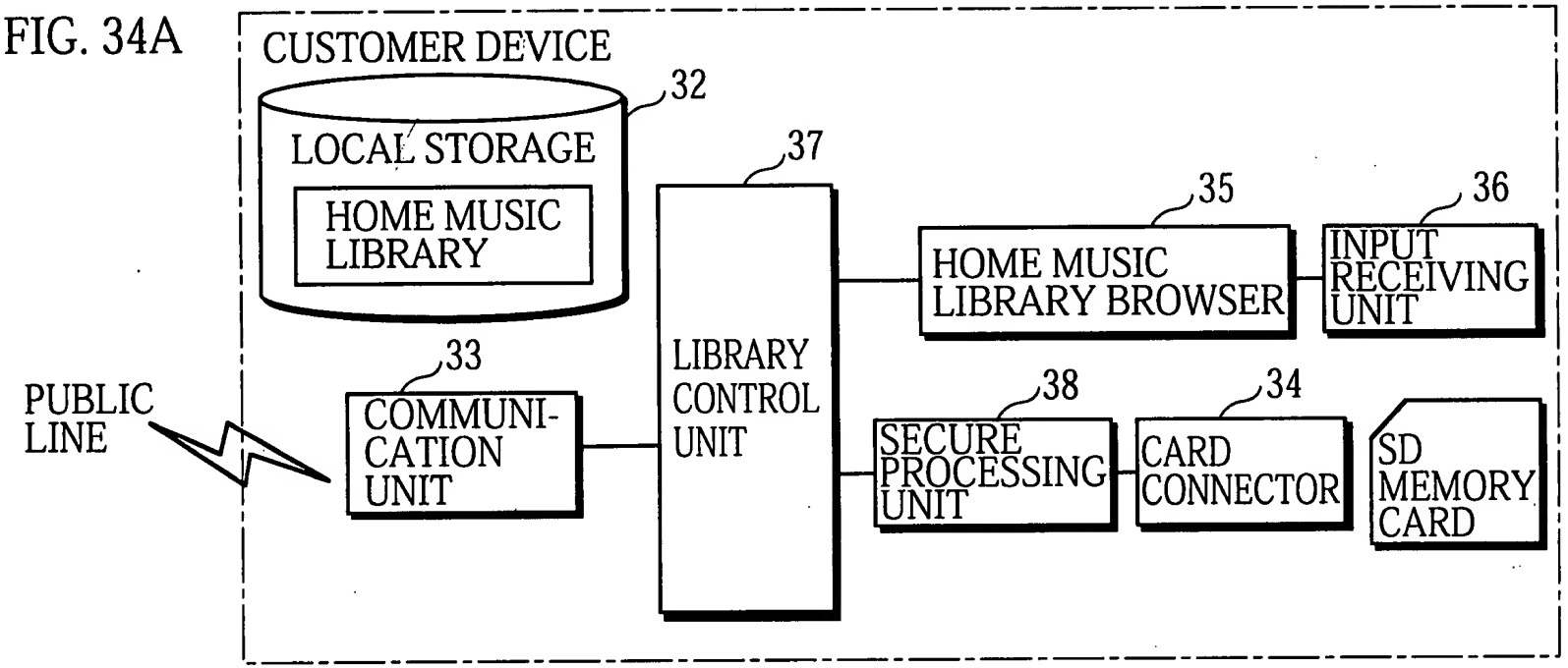

FIG. 34B

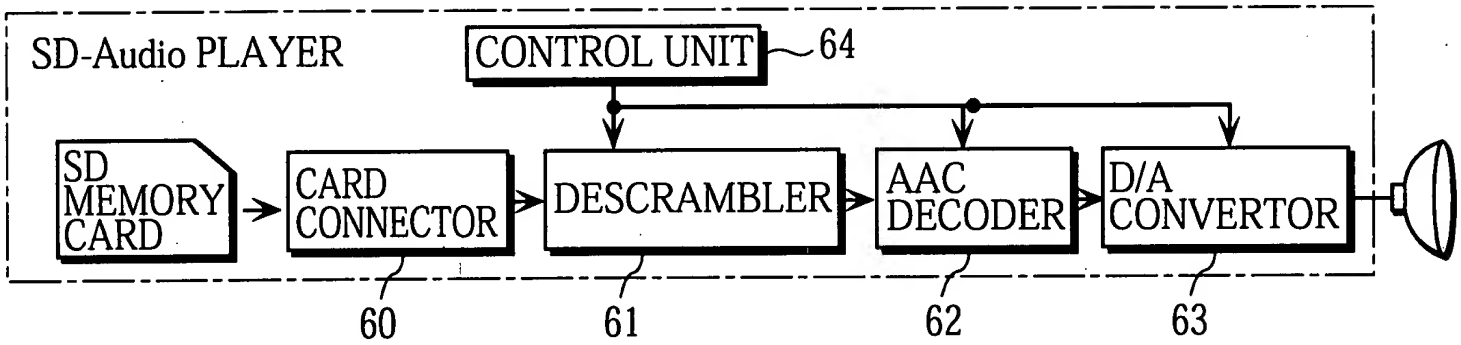

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FIG. 35

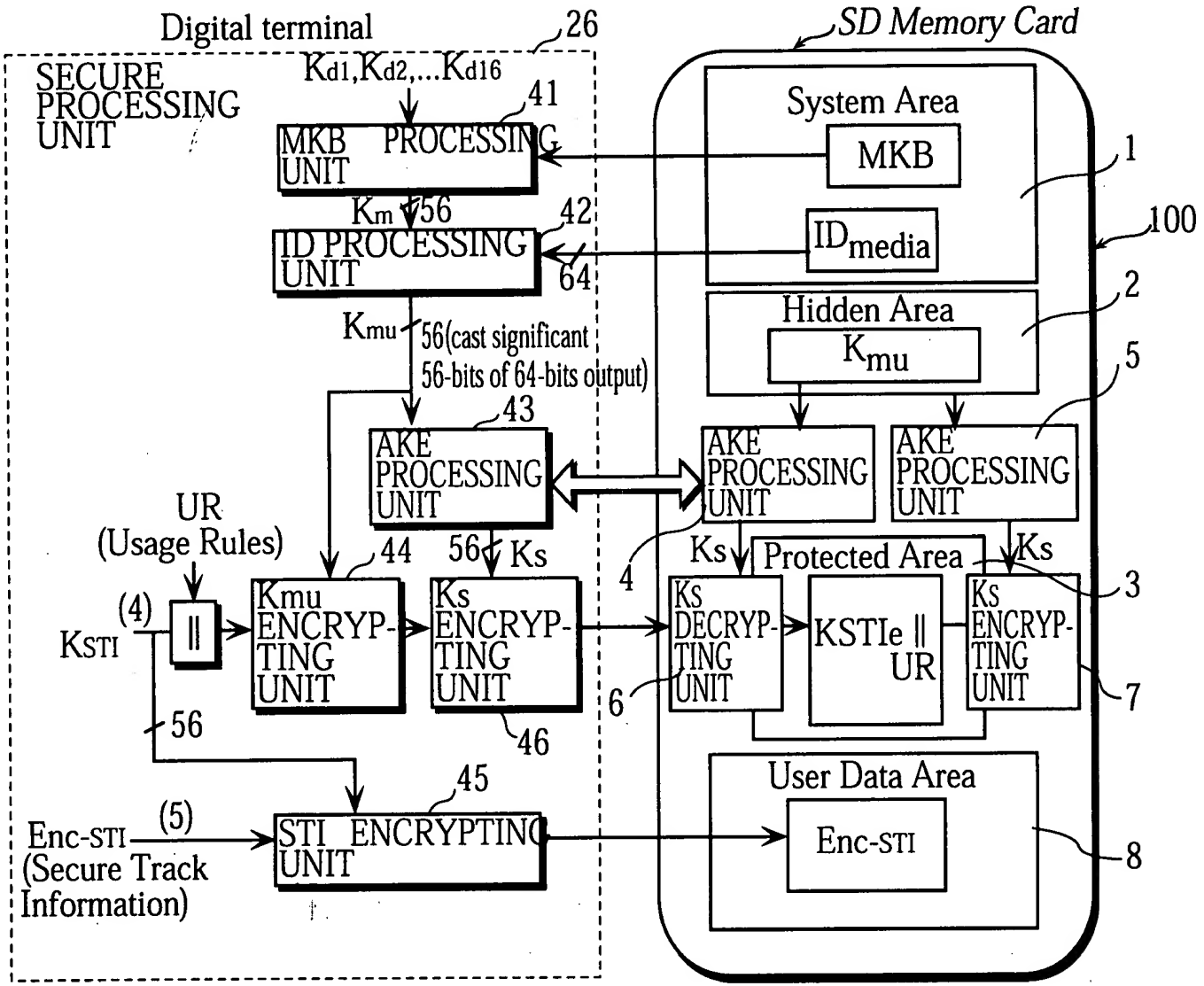

FIG. 36

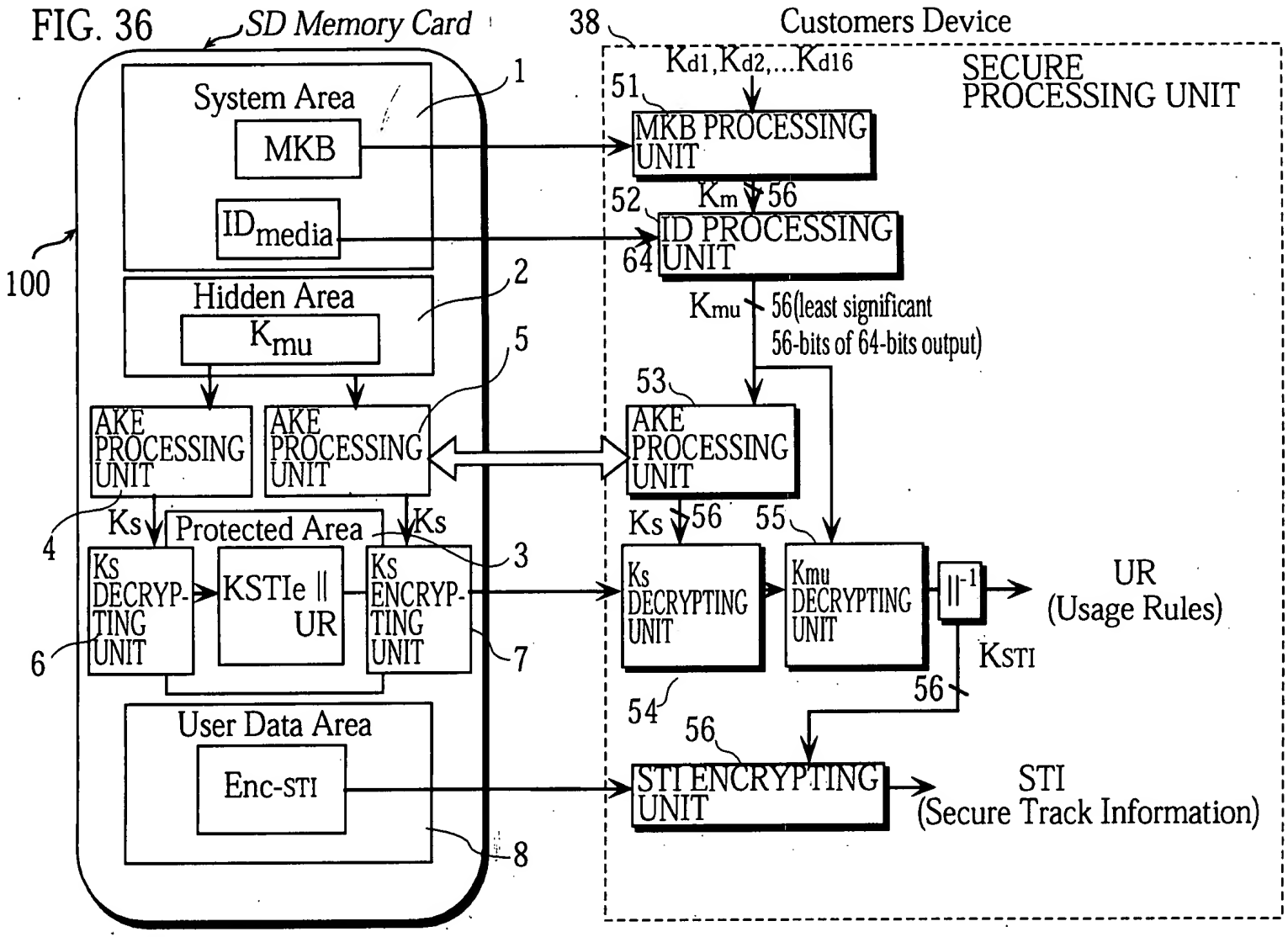
SD Memory Card
Customers Device
38
100
System Area
MKB
ID media
1
Hidden Area
Kmu
2
5
AKE PROCESSING UNIT
AKE PROCESSING UNIT
4
Ks
Protected Area
Ks
3
Ks DECRYP-TING UNIT
KSTIe || UR
Ks ENCRYP-TING UNIT
6
7
User Data Area
Enc-STI
8
Kd1,Kd2,...Kd16
SECURE PROCESSING UNIT
51
MKB PROCESSING UNIT
52
Km
56
ID PROCESSING UNIT
64
Kmu
56(least significant 56-bits of 64-bits output)
53
AKE PROCESSING UNIT
Ks
56
55
Ks DECRYPTING UNIT
Kmu DECRYPTING UNIT
||-1
UR
(Usage Rules)
KSTI
56
54
56
STI ENCRYPTING UNIT
STI
(Secure Track Information)

FIG. 37

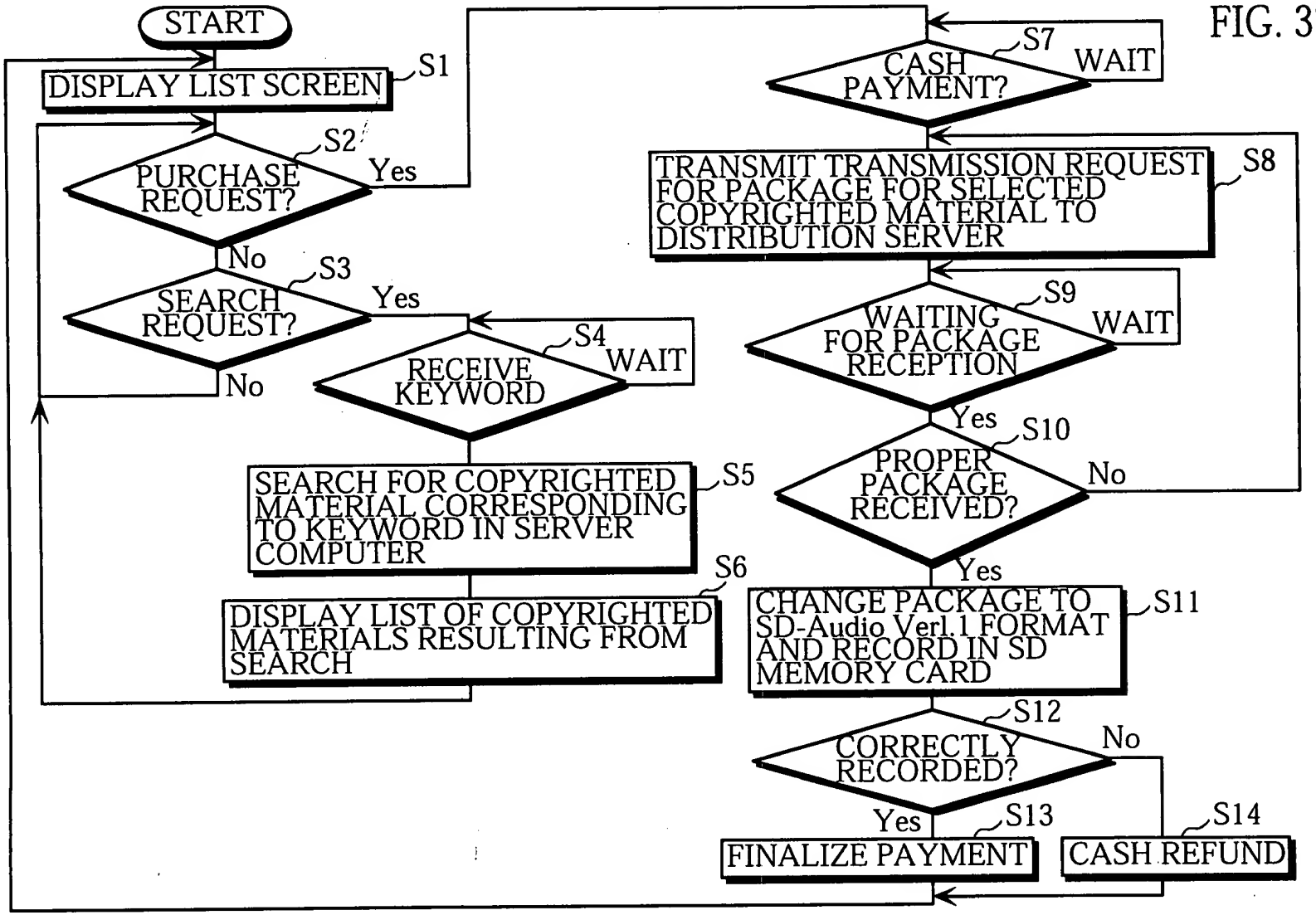
START
DISPLAY LIST SCREEN
S1
PURCHASE REQUEST?
S2
Yes
No
SEARCH REQUEST?
S3
Yes
No
RECEIVE KEYWORD
S4
WAIT
SEARCH FOR COPYRIGHTED MATERIAL CORRESPONDING TO KEYWORD IN SERVER COMPUTER
S5
DISPLAY LIST OF COPYRIGHTED MATERIALS RESULTING FROM SEARCH
S6
CASH PAYMENT?
S7
WAIT
TRANSMIT TRANSMISSION REQUEST FOR PACKAGE FOR SELECTED COPYRIGHTED MATERIAL TO DISTRIBUTION SERVER
S8
WAITING FOR PACKAGE RECEPTION
S9
WAIT
Yes
PROPER PACKAGE RECEIVED?
S10
No
Yes
CHANGE PACKAGE TO SD-Audio Ver1.1 FORMAT AND RECORD IN SD MEMORY CARD
S11
CORRECTLY RECORDED?
S12
No
Yes
FINALIZE PAYMENT
S13
CASH REFUND
S14

FIG. 38

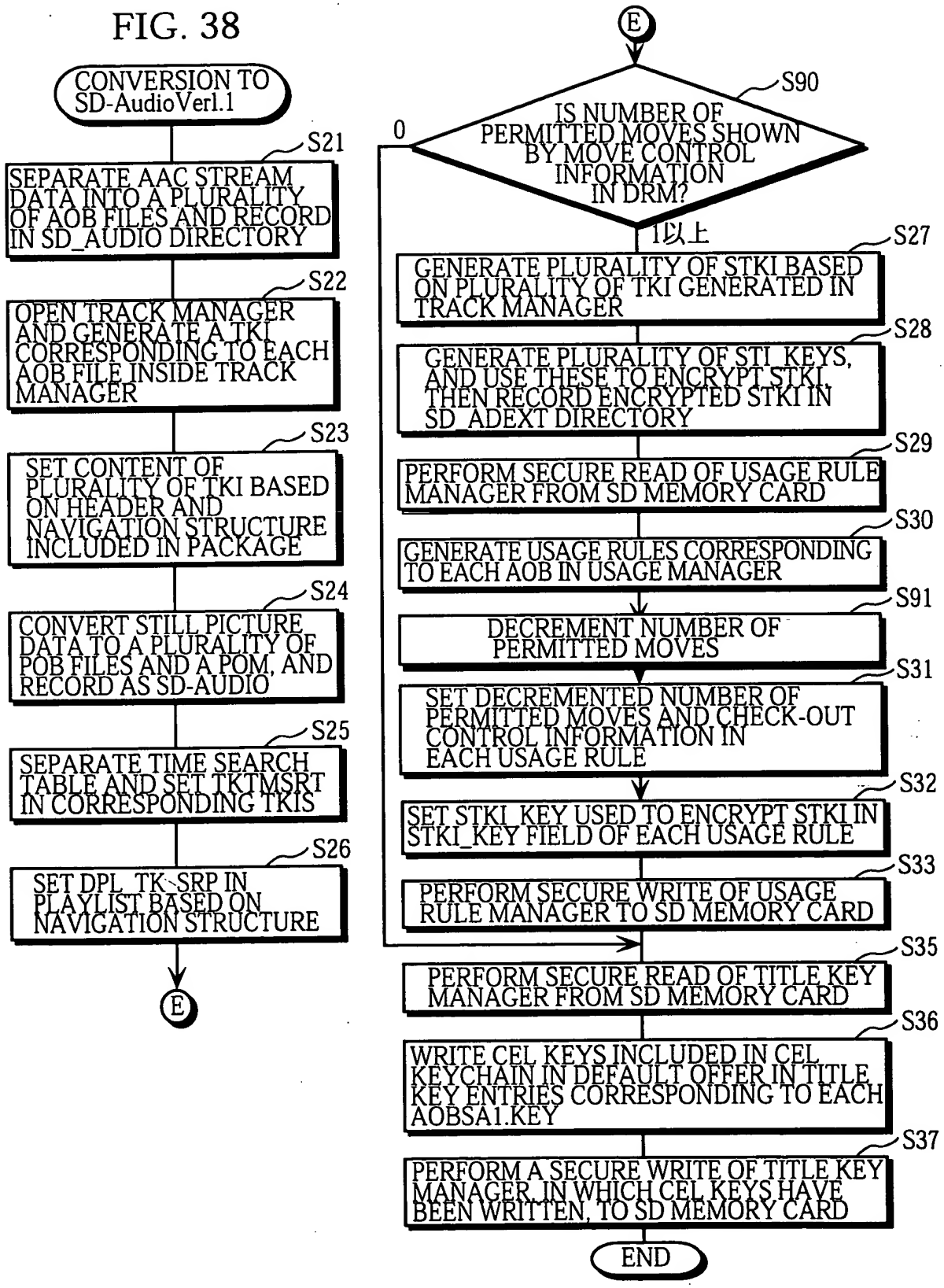

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FIG. 39

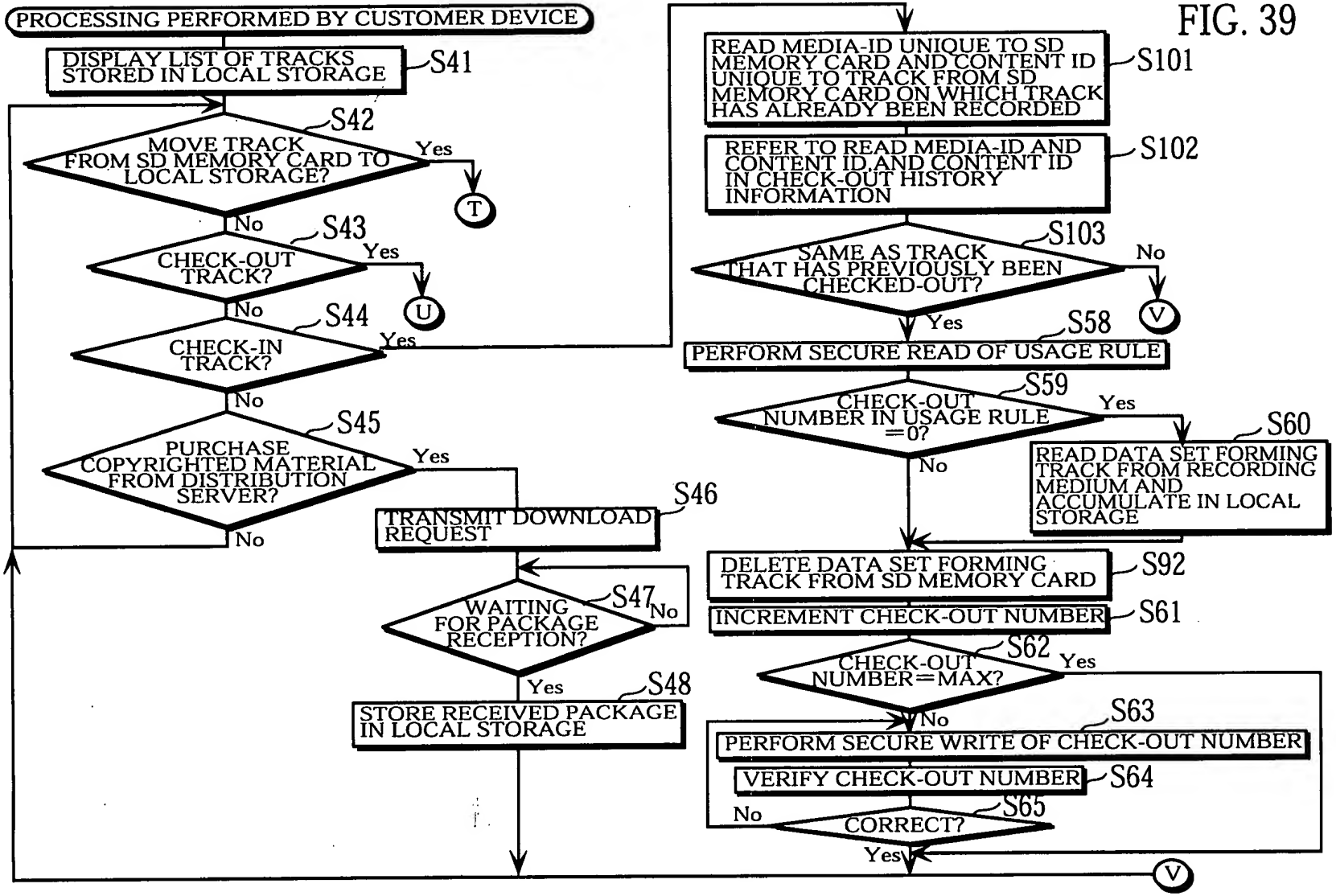

FIG. 40

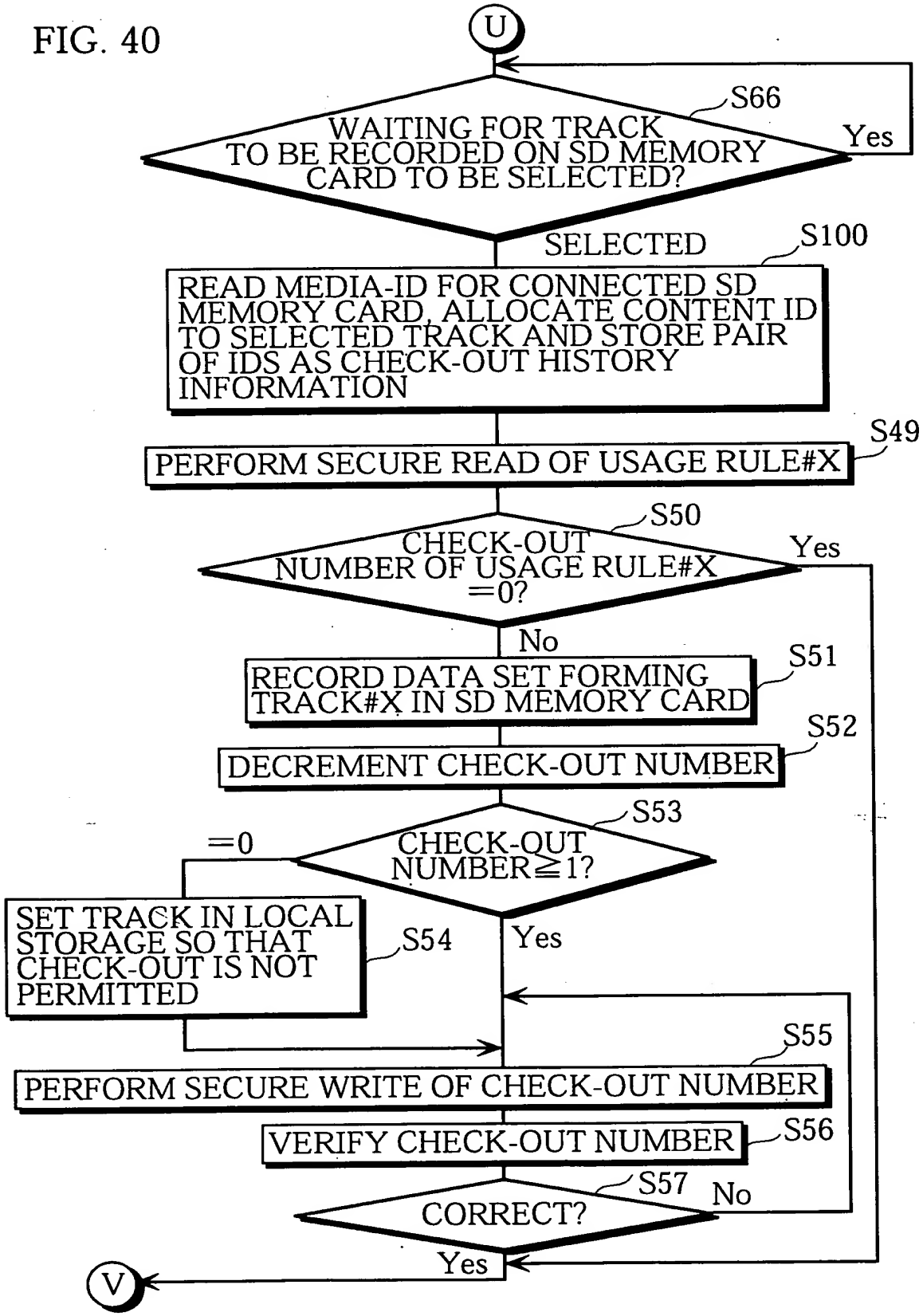
U
S66
WAITING FOR TRACK TO BE RECORDED ON SD MEMORY CARD TO BE SELECTED?
Yes
SELECTED
S100
READ MEDIA-ID FOR CONNECTED SD MEMORY CARD, ALLOCATE CONTENT ID TO SELECTED TRACK AND STORE PAIR OF IDS AS CHECK-OUT HISTORY INFORMATION
S49
PERFORM SECURE READ OF USAGE RULE#X
S50
CHECK-OUT NUMBER OF USAGE RULE#X =0?
Yes
No
S51
RECORD DATA SET FORMING TRACK#X IN SD MEMORY CARD
S52
DECREMENT CHECK-OUT NUMBER
S53
CHECK-OUT NUMBER≧1?
=0
SET TRACK IN LOCAL STORAGE SO THAT CHECK-OUT IS NOT PERMITTED
S54
Yes
S55
PERFORM SECURE WRITE OF CHECK-OUT NUMBER
S56
VERIFY CHECK-OUT NUMBER
S57
CORRECT?
No
Yes
V

FIG. 41

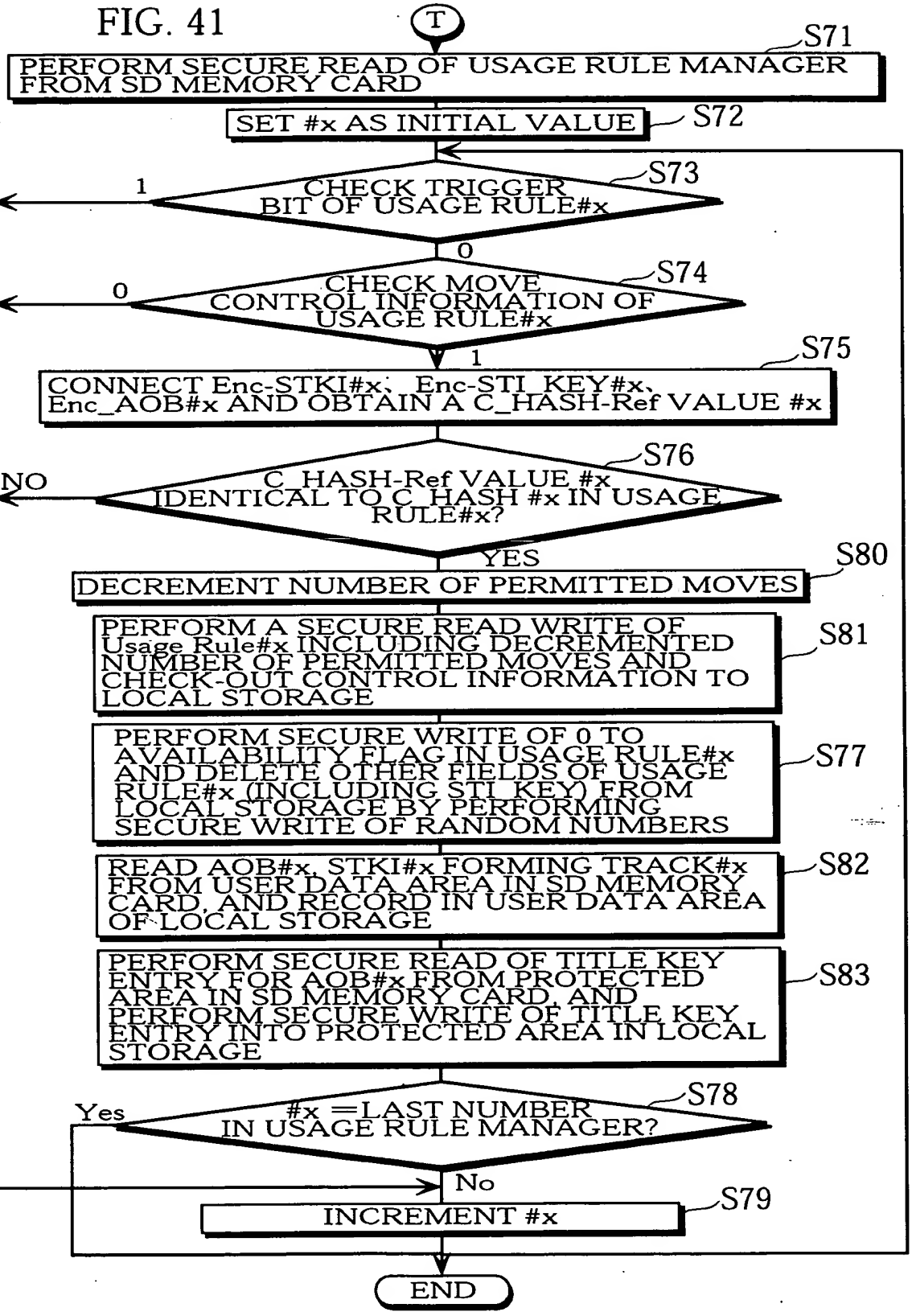

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FIG. 42

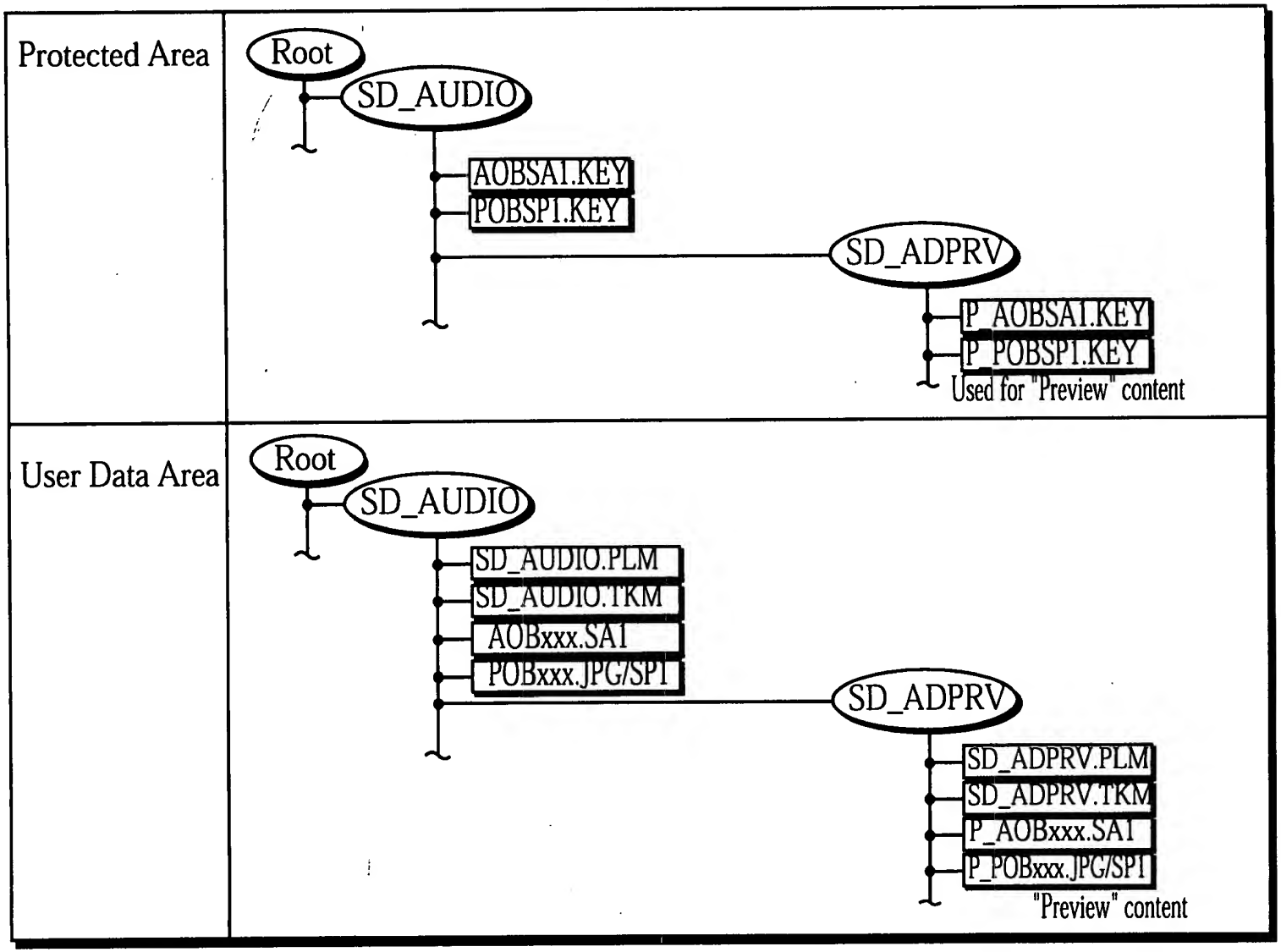


FIG. 43

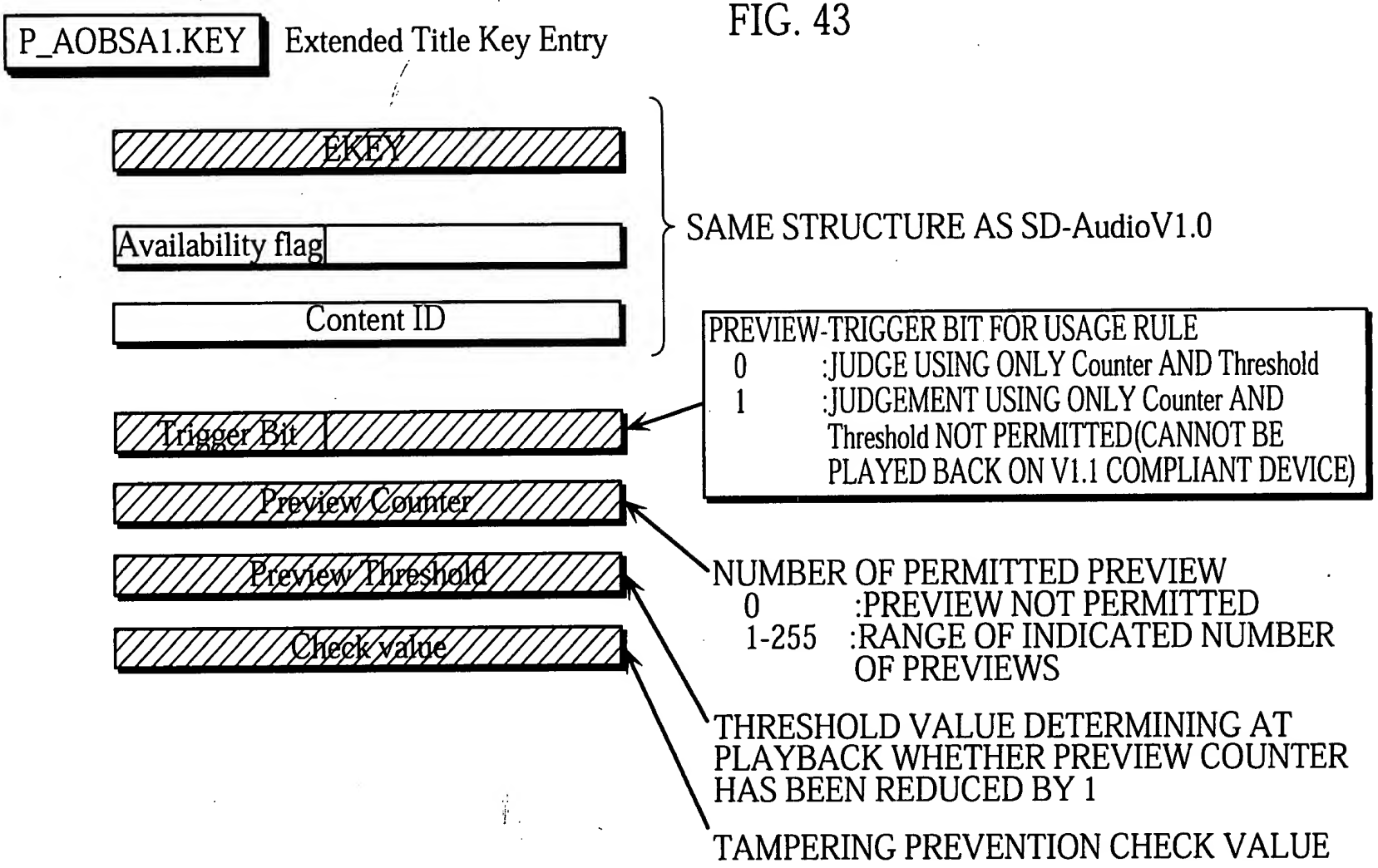
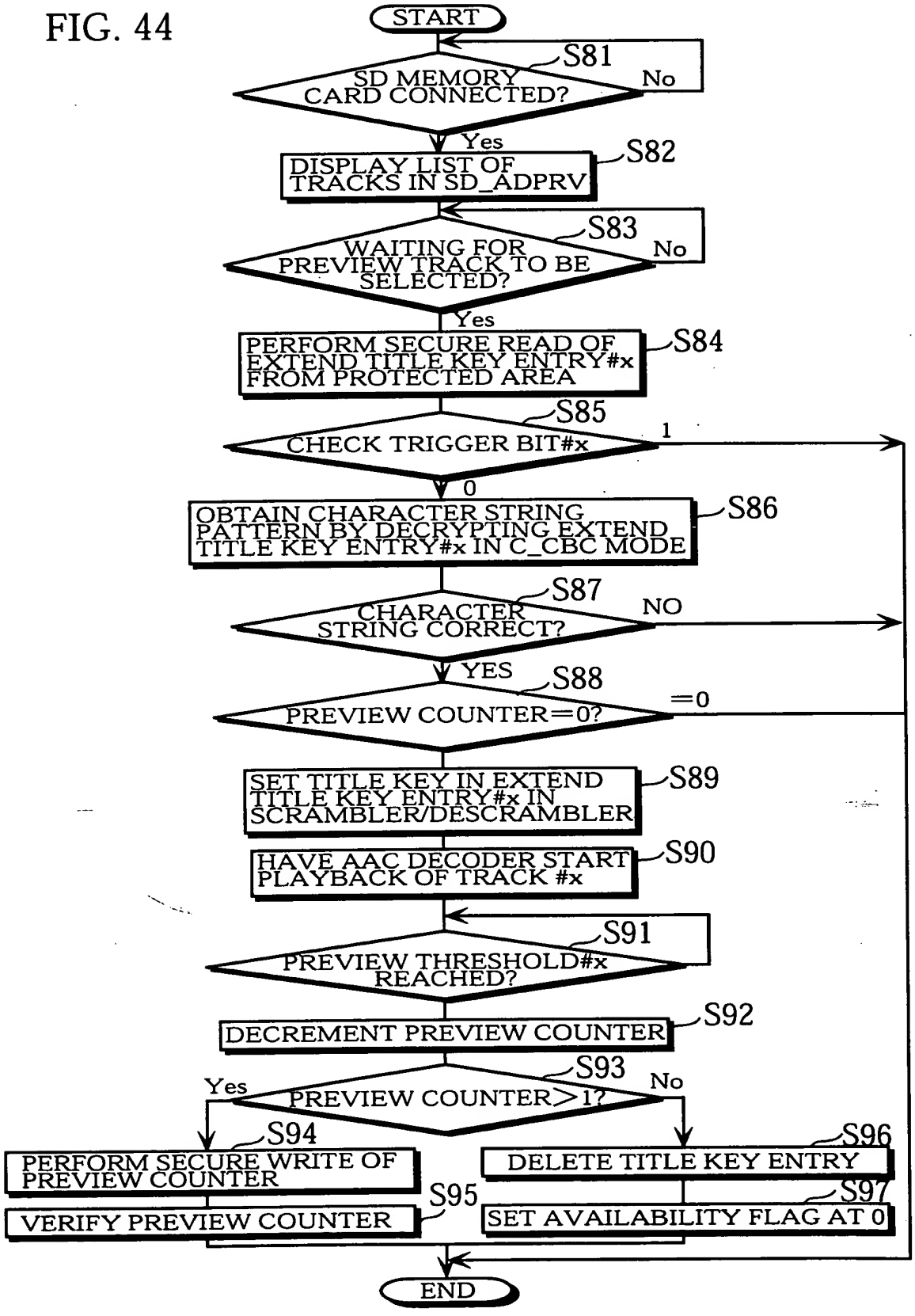

P_AOBSA1.KEY
Extended Title Key Entry
EKEY
Availability flag
Content ID
SAME STRUCTURE AS SD-AudioV1.0
Trigger Bit
Preview Counter
Preview Threshold
Check value
PREVIEW-TRIGGER BIT FOR USAGE RULE
0 :JUDGE USING ONLY Counter AND Threshold
1 :JUDGEMENT USING ONLY Counter AND Threshold NOT PERMITTED(CANNOT BE PLAYED BACK ON V1.1 COMPLIANT DEVICE)
NUMBER OF PERMITTED PREVIEW
0 :PREVIEW NOT PERMITTED
1-255 :RANGE OF INDICATED NUMBER OF PREVIEWS
THRESHOLD VALUE DETERMINING AT PLAYBACK WHETHER PREVIEW COUNTER HAS BEEN REDUCED BY 1
TAMPERING PREVENTION CHECK VALUE

FIG. 44



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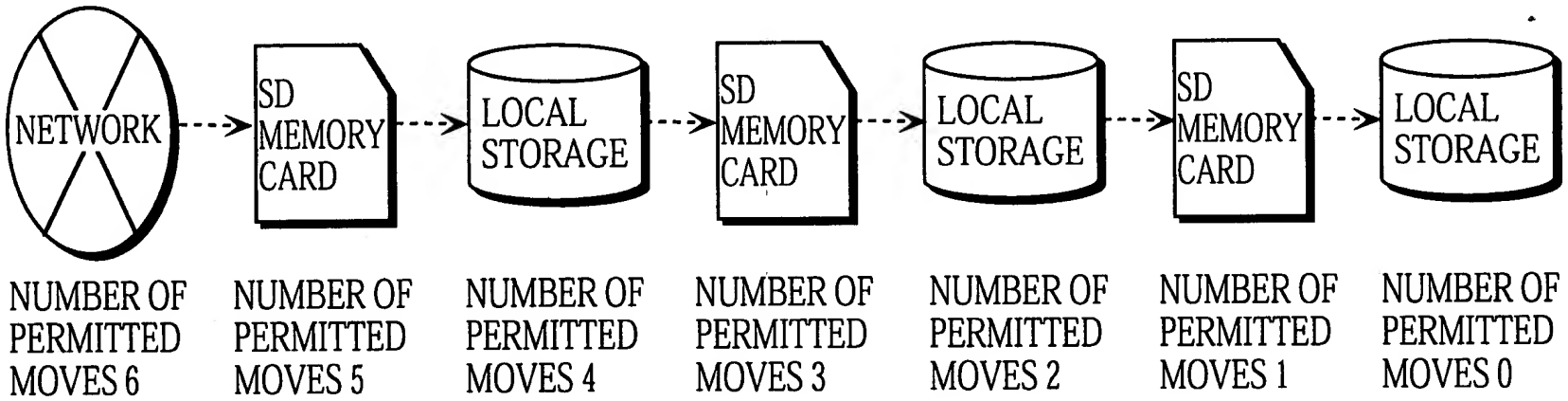
FIG. 45